1: Coon E-5 (1926-1927) 1931 MX3 Rif MX3

of containers. Water is so scarce in the Garet that the Metalsa and Beni Bu Yahyi are accused by the other Riffians of giving their food-vessels to dogs to lick rather than washing them. (See plates 2 and 3.)

In the Garet during summertime the heat rises unmercifully, to such a temperature that it seems difficult to endure; in winter cold winds blow across it, and although the ground does not freeze and snow rarely falls, the inhabitants feel considerable discomfort in the flimsy shelter of their tents.

Winter snow falls regularly in Gaennaya, Beni Tuzin, Beni Urriaghel, Beni Amart, throughout the Senhaja Sghir, and in parts of the Ghomara, as well as in the Arabophone Senhaja. On Christmas day, 1926, several inches of snow fell at Ajdir, on the Bay of Alhucemas. In the valley of Beni Bu Nsar every winter the brook freezes over, and its course is obscured by several feet of snow, which smooths off the contours of the terraces; Taghzuth is almost as hard hit, and Beni Seddath and Beni Khennus are under snow for over four months of the year, while in Zarket the snowfall is so great that a whole column of Spanish troops perished in ten-foot drifts in November, 1926. The Spaniards occupying the posts in the Senhaja Sghir have organized a ski troop, composed of Riffians who, during the last two winters, have become adept in this new method of locomotion. (See plate 1.) Both the Riffians and the Senhajans seem perfectly acclimated to the snow, from a physical standpoint. They do not seem to mind the cold as much as do Europeans, and frequently walk for hours in the snow barefoot.

The Beni Bu Nsar, Beni Khennus, and Beni Seddath are as accustomed to snow as are we in New England, and endure a climate in no wise less rigorous.

FAUNA

As far as can be determined, no competent zoölogist has worked in the region discussed in this volume. Because of the inaccessibility of the country such a lacuna is not surprising. It is therefore with hesitation that one not versed in zoölogical classifications attempts to catalogue the animals found there. I have made a list of the mammals commonly known to the Riffians, with their Berber and Arabic names and their descriptions. By comparing these names with those given by Hanoteau and Letourneau for Kabylia and checking the descriptions with Dr. Glover Allen of the Zoölogy Department of Harvard University,[1] and by looking them up in Flower and Lydekker, I have arrived at tentative conclusions as to the identities of most of them. My guesses as to species should not be taken as premature and groundless identifications, but rather as suggestions intended to stimulate zoölogical interest in that area.

Mammalia

Ungulata

tighaidat u wazghar (Arabic *ghazal*), the gazelle. This animal is found in the flat arid regions west of the Muluya, in the tribes of Metalsa, Beni Bu Yahyi, Galiya, Kebdana, Beni Said, Beni Ulishk, and Beni Tuzin, and in southeastern Gaennaya.

Gazella mhorr and *G. dorcas* are common in Morocco, also *G. isabella*.

[1] Dr. Allen has kindly gone over this section in proof, making numerous additions and corrections.

●312

AGRICULTURE I

Leading an irrigation ditch from the stream, Tesarin, Taghanth

Repairing a leaky ditch, Tigniss, Ghomara

Laundering beside an irrigation ditch, Tigniss, Ghomara

Ploughing under the fig trees, Ajdir, Beni Urriaghel

[facing p. 46]

J. Coon E-5 (1926-1927) 1931 MX3 RLF MX3

1: Coon E-5 (1926-1927) 1931 MX3 Rif MX3

252 *thasath*, the ordinary hand mill, consists of two stones, an upper and a nether, as in the water mill (singular *agharf*, plural *igharfawn*). The upper is set crookedly on an axis fastened into the lower, and a hole through the middle receives the grain poured into it by hand. The upper stone is rotated by a wooden handle set in its side. This hand mill is distributed throughout Morocco and the Mediterranean area in general.

thahont, the olive grinder, is made of a concave platform, circular in shape, about six to eight feet in diameter, and two or three feet high, its surface covered when possible with slabs of slate. In the middle of it is set an upright pole, which rotates in its socket. Through the pole is set a log handle, which goes through a millstone set on edge and reaches several feet over the lip of the platform. Olives are put in the platform, and the wheelstone is turned by men or animals pushing or pulling on the handle. (See plate 12.)

azekor, the oil press, is the second machine necessary in the manufacture of olive oil. The mashed pulp of the olives, taken out of the grinder, is put in low circular baskets with constricted necks. These are then pressed in a machine constructed as follows. A heavy log is set at one end into the side of a hill or into a pile of rocks, so that it is pivoted rather than firmly attached. The other end, upheld by a wooden screw, is prevented from slipping sidewise by two upright logs set in the ground as guides. The screw, equipped with a handle, does not mesh directly with the heavy log, since if it did so the change in the direction of the log during the descent would jam and possibly break the screw. For this reason the screw passes through a large hole in the log and meshes with a smaller piece of hard wood, pegged, with considerable allowance for play, to the log beneath it. The descent of the heavy log is thus regulated by the turning of the screw: if it is turned one way, the log descends; if the other, the log rises. A block of wood is placed between the screw and the fulcrum of the lever, so as to get the maximum pressure. Under the log are set superimposed baskets of olive mash, and the block thus serves to transmit the weight of the log to the baskets. As the log is screwed down, the oil is squeezed out of the mash and flows through the meshes of the baskets, to fall into a wooden or pottery container at the foot of the stone on which the baskets are set. The parts of the oil press are as follows:

thahont, the olive-crushing machine, complete, also the stone wheel.
amghir, the sticks in it, both the upright axis and the horizontal handle.
er hawuth, the grinding table.
azekor the pressing machine, entire, also the log weight above.
azthi, the screw.
aharush, the log which transmits the pressure from the weight to the baskets, so-called from its resemblance to a mortar.

The olive press, including both component machines, is found in every tribe excepting Metalsa and Beni Bu Yahyi. In the Branes and Marnissa is found a variant type of press, in which there are two screws, and the weight-log, the *azekor*, is not heavy, the machine thus depending for its pressure upon the constriction of the screws, which are operated from above.[1]

312 *targa*, the irrigation ditch. (See plate 9.) Irrigation ditches are led from springs and streams along the sides of valleys at a slope less than that of the streams themselves. Their

[1] Laoust (pp. 451–460) describes the variant forms of this machinery in other parts of Morocco. Baron Nopcsa (p. 137) also gives a description of the same thing in Albania. Like the turbine mill, this apparatus enjoys a wide distribution in the Mediterranean area.

1: Coon E-5 (1926-1927) 1931 MX3 Rif MX3

construction requires a great amount of skill. Where the sides of the valley are precipitous and rocky, the ditches are led around through olive logs hollowed out with the adze and supported by long wooden props; at times ditches are led even from one side of the valley to the other by means of these olive-wood troughs. The distribution of the *targa* coincides with that of *tikerathin*, or terraces, except in the lowland alluvial plains of Ajdir, Tiguisas, and other Mediterranean deltas, where irrigation is carried on without terraces. Irrigation is locally supposed to have been invented by the men of Iherrushen and Ikhuanen in the northern Gzennaya, and expert *targa* makers from these places are sent for to construct and repair ditches all over the Rif.

hassi, the well. Wells are constructed by itinerant craftsmen from the region of the Draa, who wander about throughout the Rif seeking employment. They are never molested, since they are considered benefactors of mankind, and are paid well for their work. These men generally earn as much as twenty dollars for the construction of an average well, and find employment chiefly in flat arid country where there are no springs and where wells are a necessity.

Communism in Agriculture. The Riffians, living as they do close to the soil and often not distantly removed from the prospect of starvation, have developed several social devices whereby the poor may be prevented from perishing and the rich compelled partially to support them. These charitable practices are so ingrained that no one able to act as a benefactor to the poor would venture to criticize them in public or refuse to take part in them. They concern the three vegetable products which seem most deeply entwined with Riffian life: rye, grapes, and olives.

When a man wishes to sow rye on a mountain slope, he invites as many men as wish to do so to help him. Most men who have nothing else of importance to do accept the offer, and no one refuses without an adequate excuse. In this way a man of moderate means is assured of a plentiful crop of rye, to make up for his lack of other foodstuffs.

The crew works diligently from sunrise to sunset, after which they climb downhill to the house of the owner of the rye. The latter's womenfolk have meanwhile busied themselves preparing as ample a meal for the workers as the family's means will allow, and all eat and spend the evening together. If the family cannot provide very abundant rations, the workers seldom complain, since they consider their participation in the work as a form of charity, and their partaking of the food as a social gratification to the providers of it.

Similarly, in reaping season, anyone who wishes may come unbidden and help gather in the grain, whether it be rye, barley, or wheat, and is assured of an adequate meal at the end of the day in payment. In this way people who have finished their own work may be fed without drawing on their own supplies. Gleaning is left to the poor of the village.

If two farmers who own adjoining fields or terraces possess each but a single cow, they yoke these together and plough their land in common. No family is without a cow, and since ploughs are constructed by the farmers themselves, or by neighbors especially adept at the art, without payment, the situation of a man with land and no cow or plough does not arise.

Irrigation ditches which water the tillage of more than one man are subject to communal care. Each farmer is assigned a definite amount of water during each season when it is required, the amount depending on the amount of land requiring irrigation. The water is measured by days and half-days. Each season the farmer must send out a man for every

1: Coon E-5 (1926-1927) 1931 MX3 Rif MX3

day's water he receives, to work a day repairing the system after the heavy rains. Farmers who have each but a half-day's water pair off and draw lots to see which will work, since no one is allowed to work half a day only.

At the arrival of the grape-picking season, all the poor families who have no vines and the rich landowners who have many, assemble in the village mosque, on a Sunday, chosen for this occasion because it is considered a lucky day for grapes and supposed to be immune from thunderstorms. Before this date no one may pick grapes. The local administrative council, which has summoned the families now present before it, assigns to each rich family a poor one, all members of which are to help the vine owners. The aides thus chosen assist the others in picking their grapes, washing them in *fathi* ash and water, and in setting them out to dry. No group may begin picking until all assignments have been made. After the work is done and the raisins have been dried, the rich family gives its helpers a generous quantity of the raisins. There is no set rule dictating how much shall be given, but the families benefiting from this form of charity seldom have cause to complain. If after the allotment of families there are some poor ones still remaining, the council sets them to work picking the grapes which are the property of the local mosque or saint's tomb. The workers who pick and cure these grapes are given a fourth of the product.

All the olive trees in a village, although owned by a number of different individuals and by the mosque or by a saint's tomb, are located together on the banks of the nearest stream, below the lowest terrace. The shaded area beneath the trees is a place for various types of gatherings, one of which is directly concerned with the trees themselves. When the olives are ripening and windfalls begin to collect on the ground beneath the trees, the administrative council sets the first Friday of this season as the official day for gathering them. Early in the morning most of the families, especially the poor ones, come to the olive grove and await the arrival of the council members. The latter give the signal to start, upon which the people rush under the trees and gather up the windfalls. They are not allowed to touch any olives on the trees or to start before the signal is given.

Each olive tree owner's name is written on a list in the possession of the *adl*, an officer comparable to a town clerk. A farmer is allowed to use the grinder and press, which are communally owned, only when his turn has come around. He may employ it only for a certain number of days, depending on the amount of olives his trees are capable of producing. In this way he is prevented from idling or wasting his time at the press. During the time he is there, he is required to give one cup of oil each day to each of the following:

1. The *fkih*, who keeps half of it for his personal use and saves the rest for the lamp in the mosque. This is called the cup of the mosque.
2. The *mokaddem*, or caretaker, of the mosque, who collects a cup to be sold or stored, the proceeds to be reserved for hospitality, cartridges for the village, and fines imposed upon the whole village. This is called the cup of the grinding wheel.
3. The students in the local primary school, who collect a cup which they sell or consume as food. This is called the cup of the students.
4. If there is a saint's tomb in the territory of the village, a fourth cup must be given it for its lamp.

1: Coon E-5 (1926-1927) 1931 MX3 Rif MX3

624 423 312 One of the clerk's most troublesome duties is keeping track of irrigation property. If a stream commences in the property of a certain man, that man has the right to build a ditch within his own property to irrigate his own fields, and that water belongs exclusively to him. If he wishes to sell the rights to some of the water to a neighbor, he allows the neighbor to lead water off the stream below the place at which he leads off his own water, and likewise allows this neighbor to build a ditch across his land to the purchaser's field. The purchaser must pay for the water rights and for the narrow strip of land on which the ditch runs. The clerk makes out papers for the transfer of these rights, and signs them.

He also makes out papers for other irrigation complications. One man may sell the right of one day's water per year to another man through whose land his ditch passes. If a ditch is led off from a large stream which flows through a number of villages, no one owns the original water, but any man who constructs a ditch from it has the right to the water which is led off, once he has paid for the land which the ditch crosses. Men who construct such ditches usually sell so many shares in it that in time it becomes almost communal. The shares are sold on the basis of so many day's water a year per man. If a dry year comes or the water is low, each man receives a reduced share of the water proportionate to his original allowance.

If a ditch owner has allowed another man to lead off part of his water into another ditch, under time limit or restriction, when a season of drought comes they take turns, day by day, so as to divide equally what little there is of it.

If in a series of step-terraces, built one above the other, an avalanche covers more than the top one, the owners of all the terraces in the series have to work together to remove the stones. If a cloudburst pushes these same terraces down the side of the mountain so that the top one has lowered its position, and the bottom one has fallen into the stream and its earth been washed away, the owners of the terraces go to the clerk and find out exactly how much of this particular terrace land each of them possessed. If they each owned a third, the clerk measures, with string, what arable land remains, and divides it up proportionately, so that the order of ascension is the same as before, but the area of each is proportionately reduced. If, however, the bottom one suffers loss through the action of the stream and nothing has happened to the upper ones, the owner of the bottom terrace has to suffer his loss alone. Any small loss of earth or manure due to a storm may not be recovered; the owner of the lower terrace into which it has been washed may keep it. If the boundary wall between two terraces has been broken in by the storm, and dirt has washed over the stones, making the boundary questionable, the clerk comes with the papers of the original sale and a cord, and measures the terraces anew. Then the owner of the upper terrace must build another retaining wall, and cannot recover the earth which he has lost, unless, as above stated, the upper boundary of his land has slumped downhill and the bottom terrace has fallen into the stream.

624 423 When a man's tree thrusts its branches over a boundary so that it hangs over another man's land and makes shade on it, preventing the growth of grain or vegetables, the owner of the shaded land may protest and demand that that part of the tree be removed. The clerk forbids cutting it, however, and orders the owner of the tree to give a fourth of its fruit to the other man.

624 471 The clerk also keeps track of the olive press, and of the succession of those entitled to use it. If a neighboring *bone* has no press he lets it use the one in his territory, before the

776 jnun but disliked by others, which is shown by the fact that the smoke
789 of it makes a person who is possessed with jnun weep (Andjra).

[313] In their relations to baraka there are indeed many inconsis-
776 tencies. Sayatin, if not Muhammadan jnun, are said to avoid a place
778 where there is a horse or a greyhound on account of the bâraka
789 possessed by these animals (Tangier, Ait Waryager); the neighing of a horse puts them to flight (Hiaina) or breaks the heads of forty evil spirits (Ait Waryager). On the other hand, as we have seen, they are ever ready to attack bride and bridegroom, who also have baraka, they have no respect for shereefs, and they haunt saintly shrines at night.

776 [315] One of the most common methods of warding off jnun is
789 to do so by means of a sacrifice. Frequent instances of this are found in the ceremonies connected with house-building, which, besides, contain many other practices performed for the same purpose.

[342] [317] The Ait Waryager put some tar at the place where the house is to have its entrance, and then make the threshold over it. When the walls have reached about the half of the height of the door-place, a sheep or goat or fowl is sacrificed over the threshold, and the meat
782] is eaten by the owner of the house and the workmen. Sacrifices are also in some cases made before the building commences and after it is finished; but these sacrifices are not so important as the former one, the omission of which would result in the illness or death of the owner.

●[312] [321] Among the Ait Waryager a goat or a fowl is killed at the
[782] place where the well is going to be dug; and when the water appears another sacrifice is made, but this time the victim must be either a goat or a sheep. These sacrifices are ar upon the ayitbab umhan, and their object, I was told, is to prevent those spirits from striking the workmen.

776 [324] When a jenn or jnun have actually got hold of a person,
755 attempts are of course made to drive the enemy out; and the means
789 used for this purpose are largely very similar to the prophylactic practices described above.

A favourite cure consists in the use of tar.

The Ait Waryager put tar on the top of the head, into the nostrils, and the joints of the arms and legs of a person who suffers from an illness supposed to be caused by jnun, and burn tar and white benzoin so as to make the smoke pass underneath his clothes and be inhaled by him as it comes through.

595 832 possible impediment to the consummation of the marriage; it is significant that the bride puts on the didli on the morning after her first intercourse withher husband.

787 755 [586] The Ait Waryager believe that if a person gets a sty some woman of his family is soon going to bear a child; and in order to cure it he at night puts some sticks together in the shape of a robber's hut, burns the sticks, and lets the smoke go into his eyes, presumably to rob the affected eye of its sty.

787 843 An unborn child may also be subject to other homœopathic influences besides such as affect its sex. If a woman looks at a gazelle her future child will have eyes as big and beautiful as those of that animal (Ait Warain). At Tangier pregnant women eat quince-apples (sfarjel) or olives in order that the child shall be good-looking. In Morocco, as elsewhere, is found the belief that if a pregnant woman [587] (Hiaina), or one whose pregnancy has just become apparent (Ait Waryager), sees and desires to eat a certain piece of food but is not allowed to do so, the child will have a birthmark resembling that particular kind of food; or if a pregnant woman sees some food and nothing of it is given to her to eat, and she afterwards scratches herself, the child will have a similar birth-mark on the corresponding part of its body (Ait Sadden).

787 777 [590] Some tribes on the Mediterranean coast maintain that if the sardines are plentiful the year will be good (Andjra, Ait Waryager).

777 356 [312] [593] Rezq (razq, rezq) means all sorts of good things contributing to the maintenance and comfort of life. On the other hand, if a person cuts off the water supply for his neighbour he thereby shuts the door of his own rezq (Fez).

You may also sweep away your rezq. This will happen if you sweep the floor of your house or tent at night or after sunset (Fez, Hiaina, Dukkala, Tangier, Andjra, Tsul, Ait Waryager), or even after 'asar (At Ubahti); and the Rifians of Temsaman consider it necessary that the house should be already swept before the first cry for midday prayers, about twenty minutes after noon.

[595] Similar effects are ascribed to the broom (Arab. settaba; Berb. tasttabt [Ait Warain], tastta [Temsaman], disagwust [Ait Waryager]) even when it is not engaged in its normal function of sweeping. It is said that if a person is struck with a broom God will sweep him away from the earth (Andjra), or that he or some member of his family or some of his animals will become ill or die (Ait Waryager).

3:Hart E-5 (1953-1954)1954 MX3 Rif MX3

241 near Sūq al-Arba' of Taurirt. Olive oil, extracted from a communally owned olive grinder and oil press, is the essential fat (1).

The fields, orchards and vegetable gardens (the latter producing [312] broad beans, chickpeas, potatoes, onions, tomatoes, peppers and carrots, to mention only a few) of the Aith Wuryāghil are usually terraced near the houses, along the slopes of the mountains. The vineyards, whither the families repair in September to pick grapes, are further up; and along the crests are the communal goat pastures [313] and the *ghāba* patches, where the women go to cut brushwood for their ovens and for the local mosque. Grape picking is the only important activity in September, which marks the end of the agricultural year; after this is done and after the barley has been reaped and [585] threshed and the silos piled up, people make merry and get married before the first rains begin again and the time to plow and sow has started up once more.

675 464 Herding and agricultural contracts of a verbal nature are made between the wealthier and the poorer men of the community, those who have little hiring themselves out to those who have more (2). Individuals who own more animals than they can pasture themselves hire herders who, while the beasts are in their charge, receive all the milk and butter and half the young ones born, and, when the animals are sold, half the profits; if the contract concerns sheep, they receive half the wool as well. Vegetable gardens and orchards are cared for by hired gardeners *(rabbā')* who receive one-fourth of the fruit and vegetable crop; as their job entails setting up terraces, they sometimes get one-third of the vegetables if the land is difficult to work. These same men, if they also perform all the operations necessary for cereal cultivation, are called *ikhammāsen* and receive one-fifth of the barley and wheat crop. The owner of the field supplies the seed, the animals (usually cows) and the plow as well in this type of contract, while the *akhammās* (sing. of *ikhammāsen*) provides only his muscles and a switch to keep the cattle moving while they are under the yoke. The *akhammās* contract is the most

(1) Coon, Carleton Stevens: Caravan, The Story of the Middle East, New York 1951, p. 313.

(2) Sánchez Pérez, Andrés: Aprovechamientos comunales y formas de cooperación en las yemaas del Rif, Africa, Madrid, Noviembre 1947, pp. 75-77.

3: Hart E-5 (1953-1954)1954 MX3 Rif MX3

The akhammās contract is the most common type, but also current is a slightly different class of association, called *ifarādhen* (Arabic *bil-fard*): two farmers who own plots of land more or less equal in size, but who do not have enough equipment to plow them on their own, join forces; the harvest is divided equally between the two parties. This form is particularly prevalent if each man concerned only possesses one cow or one mule. A third kind of association, called *dhūrī*, is very common in irrigable land; in this, one man supplies the land and half the seed, and the other the rest of the seed and the plowing equipment (animals and plow). The actual work, which may be done by an *akhammās*, and the payment of other hired personnel to help with the reaping, is taken care of by both parties, and the net profit, deducting one-fifth for the *akhammās*, is divided in half.

Except in the Bay of Alhucemas, where irrigation is practiced without terracing, and in the valley of the Upper Ghīs, where there is much terracing but little irrigation, irrigation ditches *(tharga*, pl. *tharghiwīn)* and terraced fields, gardens and orchards are everywhere else to be found jointly in Aith Wuryāghil; the distribution of the one is virtually the same as that of the other. Ownership of irrigation water is largely dependent upon ownership of land, for in Aith Wuryāghil the owner of a plot of land is also the owner of the subsoil, and the waters which pass through his territory belong to him. Water is utilized by human beings, animals, lands and industries; rights of preference are in that order, the industries being represented by water mills (3), the owners of which receive one-tenth of the grain which the mills grind as their commission.

The Rīf, however, is a land not favored by nature, and water is a perennial problem. In Aith Wuryāghil, the people in the mountains receive first use of the water, while those in the Bay of Alhucemas irrigate with the remainder. The turns of each family in getting water are based on the principle of equal distribution, and natural means are used to calculate the time. Men have first call on water consumption, and the rest is reserved for women, for whom it is custo-

(3) Blanco Izaga, Emilio: El Rif (2.ª parte-La Ley Rifeña): II. Los Cánones Rifeños Comentados, Ceuta 1939, pp. 101-138.

3:Hart E-5 (1953-1954)1954 MX3 Rif MX3

mary to arrange a fixed place beforehand for washing and bathing. Each *jamā'ath* (village, council of notables) works out and agrees on fines for infractions of water rights, particularly with regard to freedom of women; a small boy is stationed at a prudent distance from the women's section of the water, to keep men away (4).

It was Col. Blanco, in his magnificent analysis of Riffian customary law (5) (which has served as an invaluable aid to me in the collection of my own notes on the subject), who first called attention to the fact that in the Bay of Alhucemas, the primary ditches have secondary branches which only take up water for twenty-four hours; if there are four such secondary branches, each one only takes up water every four days. Secondary ditches in turn have tertiary branches, which take up water only during the day, or at night. The tertiary branches lead to the very small ditches of individuals, which take up water for a few hours only, these hours usually being determined by those of the daily prayers. Distribution of water is based on the tribal social structure: a *thārfiqth*, the fundamental social unit, receives water from a secondary ditch on a twenty-four hour basis, while a *jājghū* or patrilineal extended family within the *thārfiqth* may use only a tertiary ditch. If one of these family groups, during one turn, gets its water during the day, it will receive it at night in the following round, and the first in one turn will be the last in the next. All ditches are subject to communal maintenance and all the families who use them must help repair them after heavy rains have washed them out.

Water rights are still carefully regulated by the *'urf*, or unwritten customary law, and custom in respect to water channeled off from the Ghīs is different from that of the Nakūr, owing to the different nature of the rivers themselves. In the Bay of Alhucemas, the best land in the tribe, the flow of water in the lower course of the Ghīs, although slight, is nevertheless constant. The problem created by the Ghīs is that although today its volume has been artificially increased with new concrete beds for the primary ditches of Thafadhna, Bulma'iz and Libzimma, there would still not be enough water to go around if

(4) Blanco Izaga, 1939, p. 101.
(5) Blanco Izaga, 1939, passim.

3: Hart E-5 (1953-1954)1954 MX3 Rif MX3

adequate provisions, sanctioned by custom, for its apportionment had not been made long ago. Because of the relative constancy of its flow, those who irrigate with its waters know that the quantity they can expect is more or less the same at any time of year. Thus the *qānūns* dealing with irrigation in the Lower Ghīs specifically state that any man who purchases land there must buy his irrigation turn independently. Due to the fact that these *qānūns* have been drawn up in Arabic by the *'adūl* or notaries public for all to see and abide by, and to the additional fact that all the land on both banks of the river belongs to Aith Wuryāghil, disturbances of social equilibrium about irrigation water there, although far from uncommon, have been considerably less great than they might have been.

The Nakūr, however, is something else again. Although it irrigates about eight times as much land as the Ghīs, it nevertheless loses much of its potential through infiltration. While in winter I have seen it overflow its banks during a heavy storm, it becomes reduced to a muddy little creek in summer. Owing to its volume capacity, however, its irrigation *qānūns*, in this case unwritten, provide that anyone who buys land there automatically has a right to irrigation water as well, because most of the year there is a sufficient quantity for all. But the hitch is that Nakūr water irrigates not only Aith Wuryāghil but Aith Tuzīn and Tamsamān as well. Although the Spanish administration has fixed the river as the boundary between Aith Tuzīn and Ṭamsamān on the east bank and Aith Wuryāghil on the west, individuals and families from each of these three tribes still own land on the bank opposite them. In the past the river functioned less as a boundary than as a zone of transition, and because of the unclear but traditional and conservative application of customary law, there was ample opportunity for feuds to develop, which they did with great frequency, particularly in summer when the water supply was low. The *shaikh ar-fijjāḥath* (Ar. *shaikh al-fillāḥa)* or *aquwwām* of each of the opposing tribes met to parley in case of a blatant infraction of custom, such as getting water out of turn; he was backed up by his respective constituents, all of whom were armed to the teeth. In case of a general melee, Aith Wuryāghil, being the most powerful, usually won, particularly if Tamsamān and Aith Tuzīn were in disagreement with one another.

623 793 411 The fqih attended to the resources of the mosque and the necessities of the cult; and the others usually bought arms and ammunition which were lent out in necessary cases.[90] A man thus favored rarely returned his weapon, as the habus was considered to be a "rich widow".[91]

623 624 312 242 The council of the jma'th also maintained agricultural supervisors, usually two who retained this office in perpetuity, even though masters in the art could be called up in necessary instances, such as litigations over other matters.[92]

623 613 The zealous equality and jealousy of the dharfiqin making up the jma'th were generally responsible for the fact that the latter did not have an individual official representative who presided at meetings or imposed the executive of its decisions; but, at times, when one dharfiqth succeeded in acquiring, through cunning, bravery or money, some degree of preponderance, it generally came to an agreement with the others, and they all designated a representative. After this, [555] the struggle began between the representative himself, inching his way toward personal power[93], and the jma'th, which was jealous of his attributes and reputation. There were also religious struggles in 623 578 776 792 these minuscule nuclear social units, between, for example, an amrabidh desirous of politico-religious influence and the jma'th, or "power of the laymen", which, through cunning, always knew how to keep him away from the benefits of power, and also excluded him from responsibilities.

623 The representatives took the title which pleased them most, usually shaikh, but they were also known as iziddjifen (sing. aziddjif, literally "head"), or "headmen", and as imqqranen (sing. amqqran, literally "big"), or "big ones". Thus the same anarchy and confusion which we

794 871 completely independently of the French authorities, and is done as a rule in areas which generally lack the most elementary conditions of hygiene and sanitation; and pedagogical procedures are very antiquated and inefficacious, and are limited to instruction of the Qur'an.... [872] [873] Almost all the schools are of "primary instruction", and those dedicated to "secondary instruction" are few and far between[166]. Some [829] [876] students cross the border to study in the Axt Tuzin, Aith Waryaghar and Thimsaman, not because the schools in those tribes are better, but because the Rifians believe a youth studies better if he is away from his family....The students, or imhadaren, eat the ma'ruf[167], and their teachers generally are given honoraria in kind.

692 4) Judiciary Organization:--There is a qadi in Aknul who serves all of the Igzinnayen, and he holds court every Tuesday, which is market day in Aknul, and once a month in Tizi Usli (market day on Mondays) and in Buridh (market day on Wednesdays)...

312 103 5) Water Points:--The area which is richest in springs is that of Jibarna, in the Asht r-Udha, in which the following springs are to be found: 'Ain Ta'amt, 'Ain bin Husain, 'Ain Khannus, 'Ain Bu Twilal, 'Ain Rahab, 'Ain Ulad bin 'Amar, and 'Ain Dar Qa'id Midbuh. In the Asht Mhand, there are two large springs in 'Ain 'Allal; and in Asht Marar, there are 'Ain Barda, 'Ain Fargugen, 'Ain Hmid, 'Ain Darduren, 'Ain Marja, and 'Ain Tassa[168].

619 [631] 6) Political Situation and Way of Life:--This tribe never formed part of any confederation, and in spite of the feuds to which we have referred above, it has always maintained its geographical and organizational unity. Today it may be said that there are no ostensible

000 (espionage)[36] and secondly that of property. It$_{A}^{A}$ says nothing regarding
671 the question of irrigation, because within the territory of this subclan
312 there is not a single point of communal water available or usable only
614 by this jma'th, as happens in Thamasind (see Qanun of Tamasint); on the other hand, it forms part of a group of irrigating jma'ths subjected to the same norms which are described in detail in Chapter XIV, and, if it does not touch other points of coexistence and if it is observed in other qanuns, this is simply because such questions did not give rise to any disagreements, for all members of the subclan accepted the old and very well-known customs of their jma'th in good spirit.

000 And rough, practical men cannot lose time inventing or making things up, even though they may be capable of doing so.

671 This qanun, like almost all others, brings into relief the sweat, efforts and oversights of those who drew it up, in order to validate the precepts agreed upon and in order to satisfy, for those attending to them[37]; for, attentive to his individual interests, a man would wish to make an addendum if a mishap had occurred in his orchard the previous night, as in note i in the text. Amplifications or corrections [623] were required, for, fearing that they were not understood by the hard-headed councilmembers, the plaintiff was accredited before the legislative assembly as proof of his presence at the legislative meeting even if only to legislate egotistically for his orchard.

623 With this, they accredited that under a severe and formalized
182 appearance, there was no more than childishness (sic) and incapacity to govern (sic): lost in small details, strongly addicted to minutiae, passionately influenced by the latest incident, working anarchically (sic), each person obsessed with his own problems, attentive to his

574 (perhaps to deliver their portion of the expenses necessary to maintain
689 the guest), and in case one of them is opposed to going, he shall be fined a goat or one duro.

695 (Blanco: paragraph f) Valid and complete testimony. Whoever
784 should change or alter this agreement shall answer to God. Both the
693 undersigned notaries know, personally and by name, all the parties who effected the present agreement.

685 (Blanco: paragraph g) In case anyone should open a pond or an
312 irrigation ditch (thus letting out the water), he shall be fined one duro for the pond and one mithqal for the irrigation ditch.

686 (Blanco: paragraph h) Regarding the contract with the schoolmaster, if anyone should be opposed (to contributing his share to the scholmaster's annual ration of barley), he shall be fined 10 uqiyyas.

689 (Blanco: paragraph i) If those mentioned earlier in the present agreement should assemble and agree on some useful matter, and if in this case there should be anyone (of the members of the abovementioned jama'a) who is opposed (to carrying it out), he shall be fined one duro.

622 (Blanco: paragraph j) Their shaikh is 'Ali bin Muhammad bin 'Azzuz. Everything that he orders (literally, "says") must be done
693 (literally, "will be"). The parties attending know the value of the present agreement, and in virtue of this, both the undersigned notaries bear witness that they are in a perfect state of legal capacity (i.e. of sound minds and memories) (in order to be able to effect the present
805 agreement) and that they know them. On the first (day) of Safar al-Khair of the year 1285 (May 24, 1868).

000 The slave of God--may He be glorified--Muhammad al-Khattabi and 'Umar bin Muhammad, etc.

passers-by may slake their thirst. This also reflects the fact that the retention of surplus water is considered an act of bad faith by a person's neighbors; and the latter fact in part makes it necessary for irrigation water upstream to be properly carried out and led off, and thus that holdings under irrigation be leveled and conveniently prepared.

B) Usage of Water in General:

Utilization of water in the Rif presents three facets which are common to all societies: utilization by animate beings, by (or for) lands, and by (or for) industries. Rights of preference are also the same, and in the same order: first, animate objects, the surplus for lands, and what remains, for industry, which in the Rif is represented by turbine water mills (dhasirth w aman, pl. dhisira w aman), which in times of excessive dryness or drought do not have the right to utilize water from those irrigation channels which divert or subtract the flow from the principal ditch.

C) Water Points for Men and Animals:

Water points in Rifian villages whose liquid content is destined for human and animal consumption are not regulated by any by-laws other than that of designation of the hours in which men may go to them; the rest are reserved for women, for whom it is also customary to reserve, beforehand, and whenever possible, fixed points for washing and bathing. For this reason, if the village contains diverse water points, one is used by the women and another by the men; and the surplus water is channeled toward a pond (agirman, pl. igirmamen), which forms the common watering place for the animals as well as a malarial focus from which it is difficult to extinguish the mosquitoes.[118] The

312 562 [623] [681] The jma'ths agree on the amount of the fines to be imposed for infractions of these rules, especially those having to do with the freedom of women, forbidding the men either to come near them or to remain in those paths which lead to their washing or bathing sites. Ordinarily, in this case, a turn is set up for a boy to act as guard, at a prudent distance from the site, if the latter by its topographical situation or by its distance from the village renders such a move necessary.

D) Irrigation in General:

312 695 The utilization of water in the Central Rif, particularly among the Aith Waryaghar, is the object, in both general and particular cases, of agreements between the users; these agreements are made at the beginning of the summer for those water points which have a small or intermittent flow and which are of short duration. These agree- [212] ments are also usually unwritten, and they deal with the following points: 1) dams, 2) network of irrigation ditches, 3) repairs to ditches, 4) turns (nubth, pl. nubath) of those who irrigate, and 5) infractions and sanctions.

[466] The labor as well as the necessary repairs are done by compulsory personal service (twiza)[119] and proportional contributions on the part of the irrigators. Any ditches which need special work [333] done on them, such as bridges or retaining dams, are previously agreed upon to be done by contract with master-masons, with the cost of the materials included.

312 689 241 242 627 Infractions are usually reduced to: 1) appropriation by anyone of a turn or turns of water outside or exceeding his own, and 2) differences and disputes which during the "Republik" were settled

312
689
[24]
[342
[627] amicably by irrigation specialists (aquawam, pl. iquawamen). In the latter instance, the e specialists estimated the amount of damage done, and the individual who caused it had to pay for it.[120] The only penalty, most of the time, was indemnity of such damage, through, above all, small reparation projects. In case a man was also punished by fining, the fines were converted into improvements in the irrigation ditches. The irrigators did not make up special communities with their own jurisdiction or functionaries dedicated to the inspection and fulfillment of the agreements, because this rudimentary society was not fond of bureaucrats(!).....

312
621
624

312
675
423 The difficulty with these irrigation agreements rested primarily, more than on the distribution of the flow of water, on rather the outline of the ditch, for which it was necessary to acquire previously the consent of each one of the property owners on whose plots of land it ran over; these individuals did not ordinarily give in unless they themselves were given an irrigation turn; and, in addition, they made it clear that the ditch was not to cross their land but to follow the boundaries around it.

312
571
[805] Irrigation turns, in the instances dealt with here, are simple, and correspond to the same notion which will later be discussed for the bigger water-courses, and which is based upon the principle of equitable distribution, with the utilization of natural means to calculate the time. This is reduced, once the number of turns is known, to fixing the duration of these and the order in which they occur. This customarily takes place at the point of origin of the ditch or dam; once assembled, the irrigators draw lots, by which each one of them puts down a straw while another, with his back turned,

312 571 calls out the order of the turns by picking at random each one of the straws from the place in which they were deposited.[121]

E) Use of Rivers

312 675 River waters are submitted, in general, to the same considerations as mentioned above. Their free utilization by owners of riverain land has no stipulation other than that of respecting the preferential rights of upstream lands and of avoiding damage to irrigation work [181] which has already been done. The jursidiction of the riverain people does not extend to the middle of the river-bed, for, as the latter often channels out new and diverse courses due to the torrential regimen of these water-courses which undergo constant variation and subsequent modification of their banks, this would give rise to infinite incidents and frequent modifications of agreements; and all of this would be contrary to the Rifian character, essentially conservative and traditionalist.....There is also another important reason for [648] [619] understanding why this is so, this being that these long-distance water-courses cross the territories of different tribes, ones which are even independent among themselves (and certainly from each other!); and in the event that any agreements at all have been reached about water distribution, these would have been extremely difficult to fulfill and would no doubt have originated not a few fratricidal wars and augmented the already numerous points of friction.

423 675 312 Any other form of action would have been incompatible with the essence of (the social behavior of) this society at the moment in which we are studying it, in which tribe, its clans and smaller segments all have such possessive notions of the property on their territories

423 675 312 that this would have rendered useless all demands and threats voiced by downstream groupings for the transfer of even a minimal amount of flow, and in our time things have not varied; those upstream use all the water that they can, and those downstream, the overflow; and it would not occur to anybody to vary this procedure, followed since time 312 immemorial. To this procedure is very well adapted the regimen of the rivers in the Rif, in the dry beds of which water does not run on the surface, but rises up only in fixed points, each one of these forming, with the help of improvised dams, the sources or points of origin of successive irrigation ditches, making them seemingly independent.

133 241 (578) In addition, the narrow fissures which form the beds of such torrential rivers, their irregular flow, their devastating overflows and floods, in short, opposed nature and men so that the latter would have some motive for doing this and even need it for their small irrigable crop and the bare necessities of life; for it did not and would not occur to anyone to work or cultivate any more land than that necessary for his own subsistence, as anything else, overflow aside, would have attracted the envy of neighbors and strangers, and this in 675 turn would have led to blows. An association on such a large scale and for such modest objectives was, for this reason, impossible, inefficacious and unnecessary.

312 The river waters, in their upper courses, running between steep banks, scarcely need to be utilized even to a small degree on the minute riverain plots of land. In those beds, water, although actually slight in amount, is in fact overabundant, and land is lacking. Limited to the confines of the ditch by the topographical conditions

312 of the beds, the Rifians were unable to think in terms of large irrigation developments to lead the ditch to some small and dried-up meseta; for the minimal amount of these in the interior of the country and the longitude of the ditch which they would have needed did not compensate for the effort and expense they would have had nor the loathing they would have incurred (i.e. from neighboring segments of the tribes) in order to maintain the ditch as such. Nature has in no way favored the Rifians, who must gain everything they own through their own efforts. The men, the new men, the protectors (i.e. the Spanish administration) can and must do something to help them, and thus they wait for it and trust them, although up to the present time (1935), and in this connection, nothing other than prejudices and injuries have occurred, as happens with the turn of water which they have been made to cede to the Granja Agricola (i.e. model farm) of Imzuren and to a half-dozen Europeans, who, placing their minute holdings in dry rather than irrigable lands, have by virtue of more modern methods converted them into irrigated terrain; and these appear today like minute green islets among the calcinated holdings of the natives, whose ill-will and adverse commentaries are just, logical and in no way flattering.[122] "Nubth nj-Makhzin", the "turn of the Government", as they say, which means that in order to sustain it a group of mkhaznis is necessary; and the salaries of these men added to those of the directors and work force are certainly far higher than the four bushels of vegetables which they manage to obtain and the unknown profits of other kinds which they do their best to make.

[182]

648
312

181 423 The Rifian admits anything which constitutes instruction or improvement; but naturally he wants no part of any division of his 312 648 holdings with strangers. This blessing of water which the official organ (i.e. the Spanish administration) as well as individuals receive, although the latter do so only to a limited degree, is not a product of technique, profitable or exemplary work as new developments would be, possible economic outlets or improvements in the present distributive net, but utilization of native labor in the style of some early-day amghar.

312 Rare are the days of the Makhzin irrigation turn in which the Makhazniya does not present us (i.e. the administration) with some miserable akhammas[123] accused of the terrible crime of having been surprised at night attempting to lead up a thread of water into his tiny, dried-up holding, a crystalline fiber which, if it even arrives there to irrigate, only God knows; and the nubth which the Europeans derive from it, dispute from it and gain from it, did not cost them the least effort to lead up nor did they do anything other than wait sitting down while the Makhzin appropriated it. And in such a case neither the Makhzin nor the European stands to gain anything; to the contrary, they have much to lose.

F) Irrigation in the Plain of Al-Husaima:

312 675 The usage of irrigation water from the Lower Ghis and Nkur Rivers has been, since time immemorial, the object of individual agreements among the irrigators, agreements which are usually put down in writing, for the flow of water, although variable, permits a regular distribution through permanent ditches, a distribution known

312
675
(618) to all and a distribution which tradition has affirmed. These principal ditches carry water all year round, and at the present time their utilization seldom gives rise to incidents, as their usage has been stabilized and regulated, except in the case of the newly arrived Spanish irrigators, whose despondent attempts to improve their lands with fanciful enlargements, amplifications or regularizations of turns gave rise to the only disputes, aside from the ill-will of the local population already mentioned above.

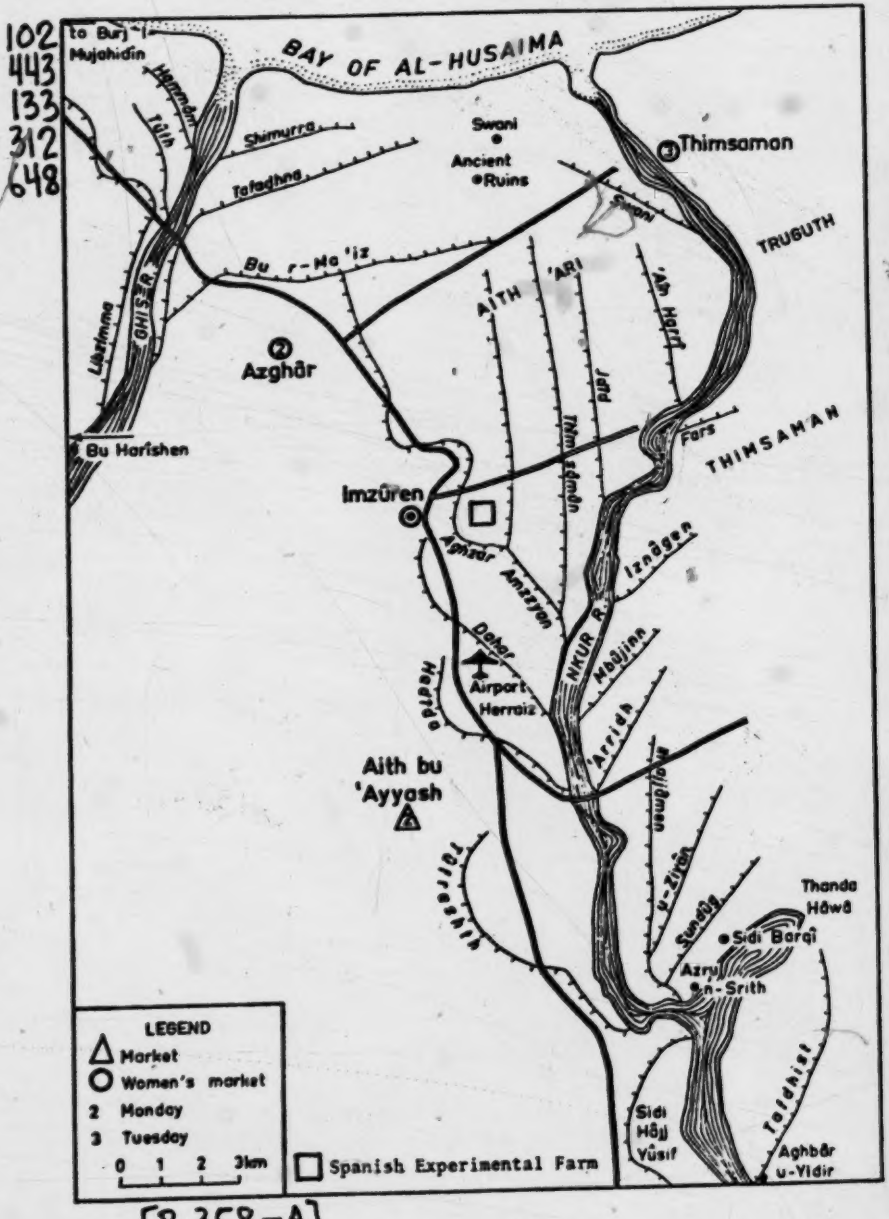
To be able to find something which leads us to the heart of the irrigation problem, it is necessary for us to look again among the individual agreements which are established by small groups of irrigators from both rivers, and descend through their steep beds to the widenings at their mouths, the journey over which has permitted us to observe the details of their irrigation system and to fix the principal idea which appears to preside over the distribution of the waters of both rivers into a diagram which we have made (see Irrigation Ditch Map of Plain of al-Husaima) for a better understanding and as a synthesis of their custom; and this is completed afterward with an outline of the network of ditches for each irrigated area and in these drawings is summarized our knowledge up to the present time.

312 The mechanism behind the distribution of irrigation water in Aith Waryaghar is simple, and up to the present time, it has satisfied local needs; it seems exact enough for the tribesmen, and so far they have shown no desire to modify it.

In the river beds there are certain points known to the people where the water always rises up; these are used as dams (uggug, pl.

5: Blanco Izaga G-4,5 (1914-1945) 1975 MX3 Rif MX3
Aith Waryaghar

BLANCO MAP II (1939) - PLAIN OF AL-HUSAIMA



[P. 358-A]

312 uggugen) for the source or origin of irrigation ditches and as partitions of the waters on both banks. After a dam has been set up, built to hold as much water as possible, it is converted into a ditch-head, in which the necessary outlets are made, and it thus acts as the point of origin of the principal or primary ditches which have a permanent flow of water; these are usually two or three in number. Although [183] these outlets are irregular, the Rifians say that a half or a third of the water is utilized in distribution; and although this is what happens in practice, in theory the distribution is far from perfect, as the tribesmen do not take into account the width nor the depth of the outlets; and these are improvised, if not actually variable. The primary ditches are distributed and divided in this way into secondary branches, if these are necessary, in which the irrigation turns proper are initiated, which means that they only take up water for twenty-four hours; therefore, if there are four secondary ditches, each one [805] will take up water every four days. These secondary ditches are subdivided in turn into other tertiary branches, also of periodic or intermittent flow, which do not take up water other than during the day or at night; and these originate the irrigation furrows of individuals which do not take up any water other than at certain hours, which are determined by those of the principal daily prayers.

312 591 613 596 This distribution of irrigation water is intimately linked to the Rifian lineage system, to the dharfiqth (which tends to have a 24-hour turn) and its component ijujga, and it is completed with one order of turns begun in the tertiary ditches through which if one of these ditches, during its turn, takes up water during the daytime,

312 571 [613] [596] in the following turn it will take it up at night, and with another order among the irrigators in which the first in one turn will be the last in the next. These two classes of turns, this order of irrigation, is usually set up for the whole duration; when it is begun, the irrigators draw lots with small sticks or twigs, and, at other times, it is set up differently every day. The transfer of

312 571 425 [432] [805] [435] turns is free, as is the decision of the person to be favored. Turns of water are the object of buying and selling, and are independent of land. A 12-hour turn every week (eight days) comes to some 500 or 600 duros (1939).[124]

312 [821] The hour to begin irrigating is that of the rising or setting of the sun, according to whether the turn itself is diurnal or nocturnal. The repairs depend on their importance and where they are made, the users of the branch in question contributing to these, downstream. The outlets or cuts of water are the responsibility of

312 571 805 the individual who is irrigating at the time. The duration of turns was regulated by means of natural hours, those of the prayers, and by measurements of the shade and the angle of the same with some object, in other words, a true sun dial.

312 627 [628] 671 Differences were resolved, as noted, by means of arbitration, valuation or assessment, or indemnification, apart from governmental intervention if this is deemed necessary, as some qanuns express.

312 184 The variations in the treatment of ditches require the conformity of all the ditch-users to be expressed by themselves or their representatives personally, in a meeting convoked to this effect on the sites which are to be the objects of modification, in the system or traditions of irrigation.

15. THE QANUN OF THE LOWER GHIS RIVER (AITH WARYAGHAR):

312 [135] From this river, the longest of those which bathe the Central Rif (more than 70 km.), as with its companion and eastern neighbor the Nkur, only the surface waters are used, and very imperfectly, by the Rifians in the small meanders which its narrow basin forms. For the [648] Rifians there is too much water and not enough land. Up to the present, the Spanish protectors have not attempted the slightest modification nor the study of the Ghis basin and its regimen with utilitarian ends in mind. It is a wealth which, like so many others, is lost. There is too much water and nevertheless the Rif is thirsty. [132] The Rifian spends the whole year looking at the sky, an attitude which has become contagious to the protectors, imploring a few drops to fall in order to save his miserable winter (author's italics) harvest[125].....

In all the long basin of the Ghis one does not perceive the handi-work of man. Neither bridges nor acqueducts, neither dams nor any [487] installations to raise up its waters. Paths wind along its pebbly and steep banks to hide themselves in the dried-up stony bed. Small [402] and winding irrigation furrows timorously make haste to return suddenly the flow which they secretly absorbed, under the shelter of thickets, after (providing water to) move some small and rudimentary turbine mill. Only at the height of Targist, military techniques with their transportation of water give such a pessimistic sight a chance to change. 312 133 It is necessary to descend kilometers and kilometers down the steep bed of the river, to about some three kilometers from where it empties

312 133 into the sea, in order to really listen and take notice at last of the song of the Ghis, the activity and human ingenuity, the fertilizing mission of the water, the utility of the same, the gentleness of the countryside, the density of the population, the happiness (by comparison) of the orchards and gardens, the wealth and well-being, the convenience for (administrative) functionaries, the advantages of technology and the necessity of associating oneself with humans.[126]

312 402 In its long course the Ghis provides the water to turn 55 Rifian turbine mills (1935).[127]

312 [103] In Bu Harishen, on the left bank of the Lower Ghis, upstream from the bridge over the river, is where this river begins its well-performed work, bored by its useless rambling, acquires freedom, jumping from its bed to spill itself over in equal parts into the three principal ditches, l-Bzimma, "the tied-up"[128], on its left bank, and Bulma'iz and Thafadhna on its right. The regimen of these ditches is indicated below and their mean longitude is some six kilometers.

[103] Sidd Dharga nl-Bzimma (l-Bzimma): "the tied-up", which takes its name from that of the ancient ruined city, al-Mazimma[129], on its left bank. Its flow is one-third of the permanent intake of the dam at [212] Bu Harishen. There is a written document which regulates distribution of its water and proves its rights to property.[130] It empties (into the Mediterranean) at the height of the ruined castle of the Mujahidin[131] on the beach, in front of the old Peñón de Alhucemas (Isle of al-[402] Husaima). It moves a mill belonging to the Qa'id Sriman r-Khattabi and to Muhand Ushshan.[132]

312 571 613 596

It has a turn cycle of six days, which are distributed among the four lineages (dharfiqin), these in turn dividing their turns among their respective branches (ijujga), in the following order:

1st Day (24 hours): Ajdir (U Hammu; U Haddu)

2nd Day (24 hours): Ughir Iyizan (U Xikhrif; U Yihya u Musa)

3rd Day (24 hours): Ajdir (U Mis'aud u Yusif; W 'Alla w Ujdir)

4th Day (24 hours): Ughir Iyizan (U Dris; W 'Alla Ughir Iyizan)

5th Day (24 hours): Bu Mqathir

6th Day (24 hours): Zawith (Fisra and Andrusen--Ushannen--Ihaddallahan--Dharwa nd-Hajj 'Abdinnbi)[133]

On the seventh day, the sequence is repeated.

Sidd Dharga n-Bulma'iz: on the right bank. It begins, as does l-Bzimma, at Bu Harishen, crossing the river in order to divide its water with Dharga n Tfadhna, and each one of these three ditches receives one-third of the permanent flow taken in at Bu Harishen. It runs for a few kilometers and reaches the sea at Swani Waddai (Lower [402] Swani). It moves three mills, the first belonging to the Qa'id Sriman (r-Khattabi) and 'Abdinnbi, the second to I'arhuthen and the third to Dharwa nd-Hajj Si 'Ari Ubarru.[134]

It has a turn cycle of three days for the three dharfiqin indicated, and they in turn distribute the water among their ijujga, which make [805] them up in their own way. The turn begins at the maghrib, or sunset prayer.

1st Day (24 hours): Imhauren: Aith 'Aru Hmid
Aith 'Abdallah u Hmid
Aith Muhand u Hmid
Aith Bu Dhimmus (only when water is scarce)[135]

312
571
613
596

2nd Day (24 hours): Dhifirasin: Aith Mhand u Yihya
Im'aruwen[136]

3rd Day (24 hours): r-Hujjaj: Aith r-'Arbi
Dharwa nd-Hajj Si 'Ari Ubarru
I'arhuthen[137]

312
571
182
613
[596]

We thus have, in the regimen of the ditch with which we are dealing, an excellent example of Rifian solidarity, observable in the turn of the Imhauren, as in times of dryness or drought, when they need more themselves, they hasten to aid their neighbors of Aith Bu Dhimmus (who are ordinarily limited to their own turn of hours of irrigation in another ditch, that of Thafadhna, as we shall see later), although by this the other three lineage branches or ijujga only harm themselves, because they defer one of their own turns by nine more days, and even if the turn is a small one in itself, they only receive it once every nine days.

312
571

For a better understanding of the mechanics of irrigation among Rifians, we shall study in greater detail the order which is followed in this ditch[138], for it is curious to observe how they have simplified it, in spite of the modifications which are introduced in the case of the Aith Bu Dhimmus, for example, with its intermittent (author's italics) rights, so as not to interrupt the turn in general; but, at the same time, how can we explain the miracle of how the thousands of Rifian irrigators and the labyrinth of ditches which traverse the Plain of al-Husaima do not produce any disturbances nor give rise to any incidents other than those occasioned by ignorance on the part of the Europeans, of which the Rifians of importance sometimes try to take advantage or the avarice of the fortunately few and ill-named "colons"?

312
571
613

We may see the ingenuity with which they resolve the problem of irrigation during twenty-four hours in a three-day turn, the same to each of the lineages of the ordinary turn as to the nine days in the exceptional case of the Aith Bu Dhimmus.

Ordinary turn:

1st Day: Imhauren (24 hours)--Aith 'Aru Hmid

2nd Day: Dhifirasin (24 hours)--Aith Mhand u Yihya

3rd Day: r-Hujjaj (24 hours)--Aith r-'Arbi

4th Day: Imhauren (24 hours)--Aith 'Abdallah u Hmid

5th Day: Dhifirasin (24 hours)--Im'aruwen

6th Day: r-Hujjaj (24 hours)--Dharwa nd-Hajj Si 'Ari Ubarru

7th Day: Imhauren (24 hours)--Aith Muhand u Hmid

8th Day: Dhifirasin (24 hours)--Aith Mhand u Yihya (again)

9th Day: r-Hujjaj (24 hours)--I'arhuthen (I'abbuthen, probably)

10th Day: Imhauren (24 hours)--Aith 'Aru Hmid (again)

[596] And thus the turn is repeated, except for Dhifirasin, which with only two (irrigating) ijujga alternates between one and the other every time its turn comes around. We see here that in the ordinary turn the nubath (pl. of nubth, "turn") of Dhifirasin irrigate once every three days, while those of Imhauren and r-Hujjaj irrigate once every nine days. Now, if we insert Aith Bu Dhimmus into the picture, we see that Dhifirasin continues to irrigate once every three days and r-Hujjaj once every nine, both on the same day as before, while, on the other hand, because of this shift, Imhauren, to which dharfiqth the new irrigators belong[139], irrigates four out of five times once every nine days and once out of five times once every eighteen days, with the

312 501 613 intercalated newcomers irrigating once every twelve days, as shown below, instead of the four lineages of Imhauren rotating every twelve days if they would have been given the right to irrigate with them.

We may observe that in reality, without any alteration of the general turn and without any injury to the other two neighboring dharfiqin which are slightly further away, the thirst of the Aith Bu Dhimmus is miraculously quenched, and how this happens:

1st Day: Aith Bu Dhimmus (Imhauren)--takes turn of Aith 'Aru Hmid

2nd Day: Aith Mhand u Yihya (Dhifirasin)

3rd Day: Aith r-'Arbi (r-Hujjaj)

4th Day: Aith 'Abdallah u Hmid (Imhauren)

5th Day: Im'aruwen (Dhifirasin)

6th Day: Dharwa nd-Hajj Si 'Ari Ubarru (r-Hujjaj)

7th Day: Aith Muhand u Hmid (Imhauren)

8th Day: Aith Mhand u Yihya (Dhifirasin)

9th Day: I'arhuthen (read I'abbuthen) (r-Hujjaj)

10th Day: Aith 'Aru Hmid (Imhauren)--recuperates its turn

11th Day: Aith Mhand u Yihya (Dhifirasin)

12th Day: Aith r-'Arbi (r-Hujjaj)

13th Day: Aith Bu Dhimmus (Imhauren)--takes turn of Aith 'Abdallah u Hmid

14th Day: Im'aruwen (Dhifirasin)

15th Day: Dharwa nd-Hajj Si 'Ari Ubarru (r-Hujjaj)

16th Day: Aith Muhand u Hmid (Imhauren)

17th Day: Aith Mhand u Yihya (Dhifirasin)

18th Day: I'arhuthen (read I'abbuthen) (r-Hujjaj)

19th Day: Aith 'Aru Hmid (Imhauren)

312 20th Day: Aith Mhand u Yihya (Dhifirasin)
571 21st Day: Aith r-'Arbi (r-Hujjaj)
613 22nd Day: Aith 'Abdallah u Hmid (Imhauren)--recuperates its turn
23rd Day: Im'aruwen (Dhifirasin)
24th Day: Dharwa nd-Hajj Si 'Ari Ubarru
25th Day: Aith Bu Dhimmus (Imhauren)--takes turn of Aith Muhand u Hmid
26th Day: Aith Mhand u Yihya (Dhifirasin)
27th Day: I'arhuthen (read I'abbuthen) (r-Hujjaj)
28th Day: Aith 'Aru Hmid (Imhauren)
29th Day: Aith Mhand u Yihya (Dhifirasin)
30th Day: Aith r-'Arbi (r-Hujjaj)

And so on.[140] To attempt to vary this unending chain which the [182] irrigation turns of the Rifians make up in those ditches with permanent flow is to promote major altercations and to upset the equilibrium of the whole of the Plain of al-Husaima.

312 The simple attempt by a Rifian miller to divert for a few
571 seconds the water of Bufma'iz so that it would flow to his turbine mill,
402 I recall, provided the motive for a sudden and vehement protest by the
578 users of this ditch, en masse, to the authorities; the whole Plain of al-Husaima took alarm to such an extent that no procedure nor influence (on the part of the authorities) could be brought to bear toward the peaceful possibility that the people might acknowledge the man's alleged right; and, nevertheless, this Plain needs more than a concerted arrangement and ordination, an improvement and rectification of the principal ditches;[141] and above all it needs a possible increase of flow for the outlet of subterranean or subalveal waters.

312 591 613 [402] Sidd Dharga n Tfadhna: on the right bank. It takes half the water from Bufna'iz, and therefore begins, as do the other two, in Bu Harishen, the permanent flow taking up one-third of the dam. It moves four mills: that of Muhammad Akuh and Si Muhammad Budra; downstream, that of Dharwa nd-Hajj Shiddi; the next, that of Dharwa n Hammu Taqar'aith, Qa'id Sriman (r-Khattabi) and Muhand nd-Hajj Hammu; and finally, that of Dharwa nd-Hajj Hammush.[142]

The turn is one of three days for the three dharfiqin using the ditch, and each lineage redistributes its twenty-four-hour flow as follows:[143]

1st Day: Yinn Si 'Amar Umrabit

2nd Day: Aith Bu Dhimmus (24 hours): Ajdir (12 hours)

Andrusen (2 hours 40 minutes or one-fifth)

Aith Bu Dhimmus (9 hours 20 minutes or four-fifths)[144]

(Andrusen and Aith Bu Dhimmus thus irrigate 12 hours between them)

3rd Day: Aith 'Aru Hmid (Imhauren) (24 hours): Aith 'Abdallah u Hmid

Aith Muhand u Hmid

Aith 'Aru Hmid

The Ghis also provides water for three other ditches before it empties into the sea: Tuth ("mulberry") and Hammam[145] on its left bank and Shimurra on its right; but they do not have a permanent flow like the others discussed above, nor for that matter is their regimen or capacity, which is somewhat arbitrary and subordinate to the others, well regulated, for an irrigator, during his turn, can, if he wants,

312 571 613 [402] lead the water to which he has a right in any of the main ditches into these three smaller ones. The ditch of Tuth, when it has water, moves the mill of Dharwa nd-Hajj Mis'aud. The irrigators of the Tafadhna ditch, whether the turn is interrupted or not, have the right to use that of Shimurra, but giving first choice to those who use it regularly.

16. QANUN OF THE NKUR RIVER (AITH WARYAGHAR):

312 675 The Nkur River has an irrigation regimen which is less exact than that of the Ghis, and the written agreements on the distribution of its waters are few and recent. One of them refers to the division of waters between the Axt Tuzin and the Aith Bu 'Ayyash, with the intervention of the Bureau of the Aith Waryaghar (in Ajdir).[146] In any case, the establishment of such agreements is based upon the same notions and the same norms as in those pertaining to the Ghis.A

312 [621] In the Middle and Upper Nkur, there is more than enough water to irrigate the meanders which the river has created, through which it is easy to affix by-laws to the 'azibs[147] of the neighboring jma'ths which own land on its banks, given the small amount of land under irrigation. [241] There is even freedom and waste, and it is not uncommon to see, during harvest time, the formation of tiny threshing floors with capricious irrigation-furrows of 300 and 500 meters in the middle of the river bed.

[619] There are meanders like Dhaghzwith n Dasa (upstream, in the territory of Axt Tuzin, and near the bridge on the right bank) and Dhazur-akhth (downstream, in the territory of the Aith Bu 'Ayyash, and also right beside the same bridge, but on the left bank), which are of relatively large dimension and which have already stabilized turns; but the real difficulties and concomitant near-perfect solutions are

A, [See pp. 361-369--Analyst]

312 [619] only found in the Lower Nkur, the principal water outlets of which, by acting as dividing lines between different tribes on both banks,[148] are Aghbar u Yidir, on the right bank and upstream from the Thanda Hawa pond, and Azru n Srith ("Rock of the Bride"), north of the former.

The latter point is the most important, where the wide Plain of al-Husaima and the ditches which traverse it may truly be said to begin. In the accompanying diagram, all these points are indicated, as well as the principal ditches, the regimen of which we shall now indicate in outline, with the hope that these notes may someday serve as the basis of a more detailed study.

West Bank:

Dharga n Dahar: begins downstream and right beside the piste to the Thimsaman, bordering it and crossing the main Tetuan-Melilla road to [402] end up in Imzuren. It moves three mills. It has two turns of twenty- 312 four hours each: one for the Qa'idate of Nkur (Aith Bu 'Ayyash) and 571 the other for that of I-Uta, the Plain. The latter, in turn, is divided into one-third for Imzuren and two-thirds for Aith Musa w 'Amar;[149] and this gives rise to the following cycle:[150]

1st Day: Aith Bu 'Ayyash

2nd Day: Aith Musa w 'Amar

3rd Day: Aith Bu 'Ayyash

4th Day: Aith Musa w 'Amar

5th Day: Aith Bu 'Ayyash

6th Day: Imzuren

312 Dharga Ughzar Amzzyan ("ditch of the small river"): In May 1938 [402] the flow of this ditch was 513 liters per second. It originates

312 (402) downstream from Dharga n Dahar, and it yields one-third of its flow to Dharga n Tusaman; it arrives at the Bulma'iz ditch at the height of Thafrasth, near the now defunct Wednesday Market of Sidi Bu 'Afif; and it moves four mills: the first belonging to Muhand 'Aida w 'Amar; the second, to 'Allush nd-Hajj Muhand u Haddu; the third, to 'Abdssram nj-Hajj Bu Qiyadhen; and the fourth, to the Qa'id Sriman (r-Khattabi) and to 'Amar 'Abdallah nd-Hajj Muhand.[151]

312 571 It has three turns: one for those upstream (designated as n-dara), another for those downstream (s-waddai), and the third for the Granja Agricola or Model Farm of Imzuren (this last on Wednesdays and Thursdays), in the following manner:

1) N-dara (24 hours, distributed into 5 ditches): 1st--Sidd r-Hajib
2nd-Sidd Inufan
3rd--Sidd Bu Kra'
4th--Sidd Ahammar
5th--Sidd Miskur[152]

2) S-waddai (24 hours, distributed into 3 ditches): 1st--Tigarth (12 hours)
2nd--Sidd I'abbuthen (6 hours)
3rd--Sidd Aith Mis'aud (6 hours)[153]

3) N-dara (24 hours, distributed into 4 ditches): 1st--Sidd Tagharbund
2nd--Sidd 'Abdallah
3rd--Sidd 'Abdallah
4th--Sidd Ishtari[154]

4) S-waddai (24 hours, distributed into 2 ditches): 1st--Imhauren (12 hours)
2nd--Aith Mhand u Yihya (12 hours)[155]

312 [402] Dharga n Tmsaman: This ditch in May 1938 had a flow of 256 liters per second. It is located on the same bank of the river, and downstream from the Aghzar Amzzyan ditch. It moves two mills (one belonging to the Muhammad nd-Hajj Ussar, and the other to Muhammad n Tahir), and it has three turns, one for the tribe of the Thimsaman[156] and two for that of the Aith Waryaghar (lineage of Aith Musa w 'Amar, subclan of the Aith r-'Abbas, clan of the Aith 'Ari), as follows:[157]

1st Day: Ifthisen (Aith Musa w 'Amar)

2nd Day: Thimsaman

3rd Day: Ihankuren (Aith Musa w 'Amar)

The three other ditches on this bank, Sidd Jdid, Sidd 'Ain Harri and Sidd Swani, only have water in times of abundance:

Sidd Jdid: At the end of May 1938 this ditch had a flow of 40 liters per second. It originates one kilometer below Dharga n Tmsaman, in the crossroad from Bu Srama[158] and the (Spanish-built) airport to the Thimsaman.[159]

Sidd 'Ain Harri: Born near the road leading from the Granja of Imzuren to Truguth (Thimsaman).

Sidd Swani: The last ditch on the west bank of the Nkur, some two kilometers from the mouth of the river.

East Bank:

312 619 675 217 [103] Dharga n Tufdhisth (???--"ditch of the hammer"??): At the point called Aghbar u Yidir, in front of the mkhazniya post of Imudh, upstream from the Thanda Hawa pond, a division of waters is originated between the tribes of the Axt Tuzin and the Aith Waryaghar in equal parts, according to a document in the archives of the Bureau at Ajdir,[160] which pertains to the agreement to which both these tribes came.

000 which pertains to the agreement to which both these tribes came.

312 613 The flow taken up by the Aith Waryaghar bathes the meander of Sidi r-Hajj Yusif[161], and is used by the Aith Umnudh lineage of the subclan of the Aith 'Adhiya of the clan of the Aith Bu 'Ayyash. It is divided [571] into two turns of twenty-four hours each: one for the lineage branch of Aith Ishshu (some 80 irrigators) and the other for the lineage branch of "True" Aith Umnudh (some 130 irrigators).[162] The flow taken up by the Axt Tuzin (clan of the Axt 'Akki) is distributed through the Dharga n Tufdhisth.

312 [823] [103] Azru n Srith ("The Rock of the Bride"): This legendary site[163], the point of departure for water from the pond of Thanda Hawa, beside the tomb of Sidi Birqi, is the principal shed for the waters of the Nkur River, and four ditches flow from it: one on the left, or Aith Waryaghar, side, Dharga n Tufrashth, and three on the right, called Sunduq (Axt Tuzin), Sidd Asiyar[164] (Thimsaman) and Ihajjamen ("barbers") (Thimsaman), respectively.

Sunduq and Tufrasht divide water into equal parts. In turn, the Sunduq ditch, by the same token, divides it with Dharga Usiyar, and the latter, in turn, with Ihajjamen, which in time of scarcity has no water.

[571] [613] The turn cycle of Dharga n Tufrasht is five days for Izakiren and two for Ighmiren.[165]

Dharga Sidd 'Arridh: begins at the same height as Dharga Hadhidha, on the other (west) bank, and beside and just upstream from the crossing of the main Tetuan-Melilla road and the piste to the Thimsaman.[166]

312 Dharga (Sidd)n Bujinn: Downstream from Dharga 'Arridh, in front [402] of Dharga n Dahar. It reaches Habbuqush[167] and moves three mills (Sriman Muhammad u Bari, Hammadi n Muh u Bari and Hmid Hammadi).[168] [591] It has two turns, for the Thimsaman and the Aith Bu 'Ayyash.[169]

Dharga Iznagen: Downstream from Bujinn, it reaches Habbuqush and [591] has the following turn cycle: Imrabdhen n Bu Zwiqa, I'abbuthen, Ims'- [402] audhen, Habbuqush and Thabirkhashth.[170] It moves three mills (Hmid n 'Amar, Si Mhand u bil-Qasim, and Muhammad n bil-Hajj).

Dharga nj-Fars: only in time of abundance.

104 Vocabulary: water-aman; irrigate-sissu; irrigator-itsissau; turn-nubth, pl. nubath; dam-uggug, pl. uggugen; sluice or dyke-sidd; ditch-dharga, pl. dhargiwin or dhargwin; irrigation furrow ("donde se rompe agua")- anqssar, pl. inqssaren; water or irrigation expert-aquwwam, pl. iquwwamen;[171] land-dhamurth; garden, orchard-dhabhirth.

6 17. DOCUMENT REGARDING THE DIVISION OF IRRIGATION WATER: TRANSLATION:

675 614 312 578 423 691 Praise be to God. After the truce (sulh) took place between the three subclans, which are comprised by the people of Ajdir and those who are with them, those of the Imhawren and the ones with them, and those of the Imrabdhen and the ones with them,[172] the water of the River Ghis which is born (literally, "comes out") in the springs of Bu Harishen and in those below it was partitioned into three irrigation ditches, in conformity with what is set down in the document which records the testimony of those who have agreed to it, the Shaikh Muhammad bin 'Ali bin Shu'aib Amhawil, wishing to appropriate for himself the water which exists above the springs, whose water is

usufructed by 'Abdallah bin Ahmad Amhawif and his brothers Awlad 'Ali bin Ahmad[173], because the water of the latter is independent of that which was concluded in the agreement, proceeded to hinder it from those (individuals and social groupings) mentioned in the above pact, alleging that it was prejudicial to the water which was the object of the agreement.

He and the Sayyid Musa'ud bin 'Ali al-Ajdiri, wakil (legal representative) of the people of Ajdir and Imrabdhen, appeared for judgment before the servant of the Sultan (may God protect him[174], the Qa'id Muhammad bin 'Abd al-Salam bin 'Abd al-Sadaq and before the distinguished and good jurisconsults and other (persons), who advised them to work out an arrangement, as is ordered in the Book (Koran) and in the traditional law (Shar'), by whatever exists in it of benefit to both parties and by the fear of what could happen as a grave emanation from the quarrel. By virtue of this, the water cited above as the object of litigation shall be divided into three parts. One-third of it, the amount of which is that of four days of irrigation, is for the aforementioned Shaikh Muhammad and his associates in irrigation; and the other remaining two-thirds, the amount of which is that of eight days of irrigation, shall be channeled into the three irrigation ditches which were the object of the first agreement made, and which emanate from the springs of Bu Harishen.

In conformity with the above, the litigation was considered as finished, as mentioned above.

No trouble remaining between them, by virtue of the above, (as well as) no quarrel, no proof, nothing which could continue the debate

675 through allegation, no litigation related to the water cited above.
578 If any of them should demand the continuation of the debate through the presentation of proofs or arguments, everything would be null and void, for neither the present nor the future provides for this. Both parties have renounced all arguments, both public or private, which they could allege, as well as all the successive declarations (or reclamations) which could be brought forth to impede putting this agreement into effect.

600 A valid and executive arrangement. Both parties attending know the value of the present act, and, by virtue of it, the undersigned notaries, who know them to be in a perfect state of legal capacity (who know them to be of sound mind and memory), make their testimony. On 28 Qa'da al-Haram of the year 1250 (March 28, 1835).

A signature follows, illegible and signed. Another illegible signature follows the first.

Legalization by the qadi: Praise be to God.--I give faith (or testimony) to the above after both 'udul (notaries) have done so.--Servant of his God.--Signature (of qadi) illegible.

18. A SHAHADA ON WATERS: TRANSLATION:

695 Praise be to God.
312
(693) Both the undersigned notaries compile the testimonies presented by the respected 'Abd al-Qadir bin 'Umar al-'Alawi, the honorable 'Umar bin 'Ali, the respected Talib 'Isa Ajtuh, and the honorable Muhammad al-'Arusi, all of the Bani Waryaghal, in which they testify (the testimony of God is the perfect one) that the water ditch, (the property) of 'Abdallah bin Ahmad Amhawil al-Khattabi al-Waryaghli[175]

695 is to be found situated above the ditch of 'Umar bin Yusif al-Waryaghli.
312 [693] This is what the witnesses of the present (act) certify without there being (any) doubt existing in it. A complete attestation.

693 The undersigned notaries who have compiled (the testimonies which
695 these individuals afforded) from them testify that the latter are in a perfect state of legal capacity (i.e. of sound mind and memory) to testify, and they know them (i.e. personally).

[805] On the 21st day of the blessed Sha'ban of the year 1150 (December 13, 1737). Two illegible signatures follow.

19. PURCHASE AND SALE OF AN IRRIGATION TURN: TRANSLATION:

Praise be to the one God.

312 The Qa'id Sulaiman bin Muhammad al-Waryaghli al-Khattabi al-Ajdiri[176]
571 432 buys, with the power and force of God, from the one who sells it, Siddiq bin Muhammad bin Siddiq al-'Abdallawi[177], one-fourth (of a part) of the irrigation ditch of Bulma'iz, (in his turn) by day or by night, his turn reappearing about (once) every nine days; on some occasions
432 he gets it during the day, and on others at night. A valid, definitive
[435] and firm purchase, so much down, without conditions of resale or op-
[436] tions (to anything) other than that assigned here), for a price the sum of which is 100 duros, in Spanish money (i.e. 500 pesetas). This amount the abovementioned seller has taken from the abovementioned buyer, thus recognizing it in front of both witnesses instrumental to the present act, freeing the buyer from it, who took over his purchase with complete possession, occupying it in his place of ownership in conformity with the traditional law and the right of rehibitory action

(against this sale which was put into effect) after the sight, pleasure and knowledge of his capability as required.

Both parties concerned know the value of the present act, and, by virtue of this, the undersigned witnesses testify to the declarations of both, for both buyer and seller are in a perfect state of legal capacity (of sound mind and memory) to agree; and the witnesses know them both by sight and by name. In the first part of Rabi' al-Thani of the year 1347 (August 19, 1928).

Servant of his God, 'Abd al-Salam bin 'Ali al-Ajdiri, may God be benevolent toward him, amen (signature). Servant of his God, 'Abd al-Karim bin 'Umar al-Khattabi, may God be benevolent toward him, amen. (signature).

Stamp of approval of the qadi: Both 'udul have borne witness (with respect to the above), which he (i.e. the qadi) accepts and to which he gives faith. Servant of his God, Muhammad bin al-Hajj Ahmad al-Bu-Dhimmusi[178], may God be benevolent toward him. Amen. (Signature).

20. SUMMARY OF IRRIGATION:

In a few words we may show the present day importance and interest of irrigation in the Aith Waryaghar, as tourists from time to time cross this splendid Plain of al-Husaima....

This Plain, under rudimentary cultivation even today (1938), as no one has succeeded or even proposed to amplify it, is completely criss-crossed by an intricate net of tiny irrigation ditches which in general do not feel the touch of water more than every eight days, and some even every eighteen days; and [illegible]or winter cultivation.

5: Blanco Izaga G-4,5 (1914-1945) 1975 MX3 Rif MX3
Aith Waryaghar

000 In my humble opinion there is more than enough water for the surface area which can be irrigated; and so much more, in fact, that the amount which is lost is greater than that which is put to use.

312 [499] Calculating grosso modo an irrigable area of 5000 hectars, bounded by the main road on the west, as well as a subalveal flow of over 1 cubic meter per second from the Nkur River, according to the approximate calculations made when the supports of the new bridge (i.e. crossing the river at Km. 20 to the Axt Tuzin and Melilla) were set up, it would not be far off the mark to estimate the flow in both rivers, plus that of Thifarwin (in the Aith Bu 'Ayyash) at some 3 cubic meters per second, or 10,000 cubic meters per hour; and this would give daily 48 cubic meters per hectar under permanent irrigation.

Most of this water is now lost in the sea....and represents several millions of pesetas lost while technicians, policy makers and businessmen show no iterest.

[571] [435] [241] It should be remembered that a single turn of irrigation water every eight days costs 500 to 600 duros in the Plain of al-Husaima, and continually produces two harvests a year.

Ghis:

Ditch of Bufna'iz -- May 20, 1938 -- carried 131 liters per second

Ditch of r-Bzimma -- May 20, 1938 -- carried 46 liters per second

Nkur:

Ditch of Aghzar Amzzyan -- May 20, 1938 -- carried 770 liters per second

Ditch of Thimsaman -- May 20, 1938 -- carried 770 liters per second

Ditch of Sidd Jdid -- May 20, 1938 -- carried about 40 liters per second

Ditch of 'Ain Harri -- May 20, 1938 -- carried about 40 liters per second

Ditch of Swani -- May 20, 1938 -- carried about 40 liters per second

21. THE QANUNS OF HUNTING (RAYAH):[179]

224 619 The data which follow have been gathered principally among hunters from the tribes of the Ibuqquyen, Aith Hadhifa (Aith Waryaghar), Zarqat, Targist, Aith 'Ammarth and Aith (or Bni) Mazduxi; and they can be considered as general hunting qanuns for the region.

A) Significance:

224 182 Hunting in the Rif was neither a sport nor a profession in the European manner. It was a physiological necessity, and it is still considered so today. A poor soil, accidented and dry, rendered it 134 312 difficult for the tribesmen to utilize its scarce sources of water; 262 and the consumption of meat was limited, because of the scarcity of animals (i.e. both domestic and wild) to Fridays, feast days, days on which pacts were concluded, days of illness, etc., and to market 262 days. As the Rifian is by necessity a vegetarian[180], sacrifices of 782 animals acquire the status of a rite, and they form a fundamental ceremony in the most transcendental and important acts of his life. Peace and war, pacts, births and deaths, rogations, etc., have to be 224 sealed with meat for greater solemnity and efficacy. In hunting, 782 therefore, Rifian society finds a physiological compensation in no 182 way negligible to its sober life and ancestral appetite for meat, the sacrifice in common and equitable distribution of which is subject to strict rules[181], the object of the most rigorous tradition and fiscalization in order not to squander the slender reserves, which are 000 appraised in a manner unsuspected by European minds. The European visitor who is entertained in a Rifian household is not in a position to appreciate sufficiently the hospitality which is offered to him,

000
[614] consideration here) are affiliated with the Ajdir segment of the subclan of the Aith Ughir Iyizan.

[614] 137--All three lineages are member groups of the subclan of the Tigarth in the clan of the Aith 'Ari.

• 312 571 613 114 138--Our own notes on the division of irrigation water from Dharga n-Bulma'iz are a little at variance with those of Blanco. There are three turns of 24 hours each, for the secondary ditches of Dhifirasin, r-Ghis Burma'iz and Thafadhna n Dara (Upper Dhafadhna). The Dhifirasin turn is distributed among the lineages of the Ibukriwen, Ihanjiqen (both of Aith Mhand u Yihya of the Plain) and Im'aruwen (this is exactly as Blanco indicates); but the Ghis Burma'iz turn is limited only to the three lineages of the Imhawren, i.e. the Aith 'Aru Hmid, Aith 'Abdallah u Hmid and Aith Muhand u Hmid. The Tafadhna n Dara turn is divided between the lineage of the Yinn Si 'Amar (branches of Dharwa nd-Hajj 'Amar and Dharwa nd-Hajj Muhand) of Lower Imrabdhen, clan of the Imrabdhen; and the Aith Bu Dhimmus (Dharwa n Muhammadi 'Allush); and this is very much at variance with what Blanco says. It is possible, but unlikely, that a change in order may have taken place after the Spanish administration put cement bases in the three principal ditches (r-Bzimma, Bulma'iz and Dthafadhna) in the Lower Ghis; and the cementing occurred long after Blanco left the Rif. It is easier (and probably more plausible) to attribute the discrepancy to ambiguity among informants; but here again, the pitfall of using ambiguity as a scapegoat is that even the least intelligent users of any ditch are always thoroughly conversant with which lineages use it, how much time and how long the cycle is, and in what order it comes. For it is standard irrigation practice in the Plain of al-Husaima that each dharfiqth receives water for 24 hours at a stretch, and that after this, the supply is cut off so that other dharfiqin can irrigate.

000
[114] [614] 139--Blanco is in error here for not being familiar with the segmentary minutiae of the Aith Waryaghar. The Aith Bu Dhimmus lineage does not belong at all to the dharfiqth of the Imhawren, whose clan affiliations are with the Aith 'Ari, but to that of the Aith Yikhrif w 'Amar in the subclan of the Isrihan, of the Aith Yusif w 'Ari.

[114] 140--Our own fieldnotes on the subject say nothing of the staggered, around-the-clock rotation every twelve days of the Aith Bu Dhimmus after their insertion into the routine of the Imhawren turn; but we think we are at fault here for not having gone into the matter thoroughly enough. Blanco is indeed to be congratulated here not only on a truly original discovery, but on an excellent exposition of his material as well.

141--This statement proves that in Blanco's time the three principal ditches emanating from the Lower Ghis had not yet been cemented.

142--Only the lineage of the Dharwa n Hammu Taqar'aith is of the Imhawren subclan of the Aith 'Ari; all the rest of the individuals and lineages mentioned here are resident in Ajdir of the Aith Ughir Izan subclan of the Aith Yusif w 'Ari.

143--Our own notes on the distribution of water from the Tafadhna ditch, while not as detailed as those of Blanco, are nonetheless largely in accord with his. The ditch has a three-day cycle: Imhawren (24 hours),

000

151--The third-mentioned individual was from the Aith Bu Qiyadhen lineage of the Aith 'Adhiya subclan of the Aith Bu 'Ayyash, and the fourth from Ajdir of the Aith Yusif w 'Ari. The others were unidentified.

312 571 613 614

152--Sidd r-Hajib irrigates the Aith Musa W. 'Amar and Iswiqen n Waddai (affiliated with the Aith r-'Abbas subclan of the Aith 'Ari), for the most part. Sidd Inufan irrigates the territory of the same lineages, as well as the land of a few intrusive families of Shurfa Wazzaniyin from Snada (Aith Yittuft), those of Sidi l-Hajj Mikki and Sidi Brahim. Sidd Bu Kra' irrigates up through Imjjudhen (of the Imhawren subclan of the Aith 'Ari), as well as r-Mruj and Ahamri (the site of the Granja). Sidd Ahammar irrigates land bought by the Hajj Hmid n 'Abdssram Bu 'Ayyashi, the son of 'Abdssram nj-Hajj Muhand Bu Qiyadhen mentioned in note 151; and it irrigates land of the Ihankuren lineage (in Aith Musa w 'Amar) as well. Sidd Miskur irrigates Ifthisen (Aith Musa w 'Amar) and the Ifqiren (Aith 'Amar u Bukar of the Lower Imrabdhen).

153--These ditches are presumably named for the lineages which use them: Tigarth and I'abbuthen (both of the Tigarth subclan) in the Aith 'Ari, and Aith Misa'ud in the Lower Imrabdhen.

154--Sidd Tagharbund irrigates for the Ihankuren (of Aith Musa w 'Amar of the Aith r-'Abbas subclan of the Aith 'Ari), Imjjudhen (of the Imhawren subclan of the Aith 'Ari), certain lineages of Bu Minqad (again of the Aith r-'Abbas of the Aith 'Ari), the (Lower) Imrabdhen of r-'Azih Imzuren, and, in 1953, for the then Pasha of Villa Sanjurjo (al-Husaima), Mikki n Sriman r-Khattabi, of Ajdir. Sidd 'Abdallah irrigates for the Ifqiren lineage (of Aith 'Amar u Bukar of the Lower Imrabdhen subclan) at r-'Azib Imzuren, Sidd Arbib ("dam of the step-child") irrigates for the Ifqiren and Ma'iza lineages (also of Aith 'Amar u Bukar) at r-'Azib Imzuren. Sidd Ishtari irrigates for the Imrabdhen of r-'Azib Imzuren, and for the Imhawren, Aith Musa w 'Amar and Bu Minqadh lineages (the last three of the Aith 'Ari).

155--As indicated, the Imhawren are a subclan of the Aith 'Ari, while the Aith Mhand u Yihya are a lineage of the Isrihan subclan of the clan of the Aith Yusif w 'Ari.

000

156--For whom, presumably, the ditch was named in the first place, as those of its members who are nearest it share a turn from its water.

613 571

157--Our notes state that the Dharga n Tmsaman always has a right to one-third of the water from Dharga Ughzar Amzzyan; and that there are four, rather than three, turns of 24 hours each, the fourth being that of the Aith 'Amar u Bukar (Lower Imrabdhen) of Ma'iza.

613 614

158--A lineage of Izakiren community in the subclan of the "True" Aith Bu 'Ayyash, clan of the Aith Bu 'Ayyash.

159--Sidd Jdid is used in summer, when water is scarce, by the same lineages who use Dharga n Tmsaman.

160--This document is not given by Blanco in translation.

633 [504] The area is administered today from the small port and provincial capital of Alhucemas. The growth of this urban center, fishing port, and tourist attraction is but a recent [175] phenomenon. The city, founded in 1925 with the invasion of a Spanish fleet, has been the focal point for whatever innovation that has occurred in the Central Rif in this century.

133 361 Directly behind the city of Alhucemas is a flat plain. Although the land here is rich it was uninhabited prior to the Spanish because the terrain was indefensible during times of feuds. The original population was situated in the foothills [712] and higher mountains. Here homesteads were scattered and since they also served as garrisons or fortresses they were located on hills or ridges which could be defended militarily.

133 The area is not well served by rivers, the principal ones being the Rhis and the Nekor. The former rises in the Sonhaja area and empties into the Mediterranean at Alhucemas. The latter starts in Igzinnayen territory to flow along the border of the Beni Wariyaghar and the Beni Tuzin, emptying into the bay at [312] [161] Alhucemas. Both these rivers and their tributaries are used for irrigation and the population density is higher along them. There are also a good many natural springs (generally regarded as holy sites) and wells have been successfully dug in some of the valleys.

132 Rainfall varies annually and at times disastrously. At the weather station in Alhucemas during the decade 1946-1955, rainfall ranged from 8.5 inches to 16.9 inches. Although the

243 While barley is the predominant crop, maize is an important secondary one. Wheat and rye are also grown but the latter is held in low esteem as a food product[1] and the former does not grow successfully on the thin residual soil of the region. In 241 [312] those areas where there are rivers or streams, small gardens are maintained by irrigation canals. In these are cultivated potatoes, tomatoes, onions, garlic, squash, turnips, green peppers and mint.

245 In addition to the grains, maize, and small vegetable gardens, many households also have orchards of fruit and nut trees. Fig, lemon, orange, pomegranate, walnut, almond, and olive trees are common. In some areas grapes are also cultivated. Around each house is a grove of prickly pears which serves not only as a means of preserving privacy, but also as a source of food. These products not only supplement and add variety to the regular diet but in the case of oranges, almonds [258] and grapes serve as cash crops. The olives are pressed by the [262] women to provide crude cooking oil. Nuts, dried grapes and figs [221] are an important winter food reserve. The work of pruning and grafting goes on during the months of February-March-April.

243 In early summer harvesting begins. Both men and women engage in this activity, the men doing the reaping with hand

---

[829] [1]Coon (1931:47-48) states that rye is highly praised by the Riffian but that since the Arabs scorn it as a foodstuff the Berbers are ashamed to admit its worth.

443 182 571 [452] [554] He can get credit in the local shops on the basis of his reputation. Here he can consult relatives and friends, settle petty disputes, arrange marriages and sell property. His ties to the marketplace do not depend on "improved communication" but on a whole series of both economic and noneconomic involvements with the local market.

443 182 What is the nature then of this local market? I shall try to arrive at a picture of the common elements of all <u>suqs</u> of the Rif, although there will be slightly different elements or emphasis in each specific <u>suq</u>. As Bourrilly comments, "L'importance de ces souks varie naturellement avec l'importance des régions qu'ils desservent, de la clientèle qu'ils attirent, des zones de production dont ils sont le débouché" (1932:211). Still, after spending many weary days in such places one cannot help but sympathize with Albéniz: "Visto y descrito uno cualquiera de ellos, están vistos y descritos los demás" (1930:118).

443 [651] Most of the markets are walled-in enclosures with only one or two openings, assuring the collection of market taxes. They [366] are ideally located near a source of water so that animals can [312] drink. Special places outside the walls are allocated for the quartering of mules and donkeys. Inside the market are rows of permanent structures, either small shops or cafes. On a non-market day the site will be deserted except for a few soldiers assigned to each market and a few tribesmen, sitting inside the canteens drinking tea.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

Spartel as far as the western flank of Jbil Musa. Today this coast commands one of the world's great trade routes. For the Ancients the Pillars of Hercules marked the end of the known world, the very limits of civilization. In medieval time the Arabs rarely ventured into the Atlantic, and in the great age of exploration the Occidental Muslims limited their activity to piracy. For Morocco this coast has been a bond with Spain. By this almost terrestrial function the Strait of Gibraltar assumed a decisive role in Moroccan history. It was to guard the southern flank of Betica that Emperor Claudius created the province of Mauritania Tingitana in A.D. 46. The proximity of the two shores allowed Islam to conquer the Iberian peninsula, and the Spanish, in turn, to extend their influence to the Moroccan coast.

On the Mediterranean coast Morocco faces the great highway of civilization, but that shore, almost completely devoid of shelter, has never had an important maritime activity. A few fishing boats operate on calm days, but their sole function is to carry nets and seines a short distance beyond the surf. No road or trail of any significance follows this coast. Immediately east of the delta of Río Martín (Wad Martil) the coastline consists of a series of high cliffs cut by deep barrancas (pl. 1, *a*). This pattern, except for the small coastal plain formed by the deltas of Wad Ghis and Wad Nkour, continues as far as Melilla.

Climate

The climate of northern Morocco is of the Mediterranean type. In its simplest form this type of climate is characterized by (1) concentration of precipitation in winter and spring, the summers being nearly or completely dry; (2) warm to hot summers and mild winters; and (3) a high percentage of the possible sunshine for the year. From the Atlantic coast eastward to about 4° west longitude, irrigation is unnecessary for cereal crops. Within this zone the average annual precipitation ranges from 400 mm. to more than 1,000 mm. The extent of this range reflects the extreme contrasts of exposure and elevation. The drier zone, with precipitation totals of 400 mm. or less, begins on the eastern edge of the Rif chain.

Figure 6 was compiled from published records of forty-five weather stations for the decade 1946–1955. The former date is the earliest that can be used if conditions in the entire zone are to be compared. The records of a few stations extend to earlier years, and the Catholic Mission in Tangier has recorded weather observations since 1912. But data have become available for the interior of the zone only since the end of the Second World War.[7]

Precipitation decreases from north to south on the Atlantic coast, and from west to east on the Mediterranean coast. Tangier, with 810 mm. (31.9 in.), is the wettest coastal station in the zone. At Arcila, only 40 km. to the south, the total is 611 mm. (24 in.). On the Mediterranean coast, Ceuta with 560 mm. (22 in.) contrasts with Wad Lao with 460 mm. (18.1 in.), Puerto Capaz with 330 mm.

[7] For observations recorded prior to 1944, see *Resumen de las observaciones meteorológicas efectuadas en la zona de Marruecos hasta 1944* (Tetuán: Imprenta del Majzen, 1946). The years 1944–1946 are covered in a supplement published in 1947. Since the latter date, weather records have been published monthly in the *Boletín Mensual Climatológico del Servicio Meteorológico en Marruecos* (Tetuán: Imprenta del Majzen). For data on precipitation elsewhere in Morocco see *Atlas du Maroc*, Planche 4 *a*, "Précipitations annuelles" (Rabat: Comité de Géographie du Maroc, 1958), and the "Notice explicative" that accompanies the map.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2
Senhaja MX4

is extended into an L- or U-shape, and similar units are added by the grandchildren (fig. 16). In Ghmara and Sanhaja as-Srair, growing families are often accommodated by the addition of a second story, but this type of architecture is rare in the deforested areas of Jbala and the Rif.

The necessary conditions of settlement are adequate amounts of land and a reliable source of water. Water is the more critical requirement. There must be sufficient water for drinking, watering the animals, washing clothes, taking an occasional bath, and, if possible, operating a grist mill. The runoff of the stream should be sufficient to irrigate a few precious plots of terraced land in which to grow vegetables and protein-rich legumes. In Jbala most hamlets appear on ridges overlooking the cultivated land. In Sanhaja as-Srair the preferred settlement sites are near the bottoms of valleys, close to perennial streams. Settlement forms a continuous line where terraces can be constructed along a large stream. The valley of Abd al-Ghaya in Ktama is a narrow ribbon of terraces and houses, stretching ten kilometers. In the valley of Taghzut the ribbon form of settlement is even more striking.[1] The concentration of settlement in deep valleys imposes severe barriers to communication. In Bani Hmid and Bani Bu Shibat, neighboring hamlets are often separated by ridges towering several hundred meters above the inhabited land. Similar problems are created by the deep ravines on the Ghmaran coast. To visit a friend or reach the nearest market, many tribesmen must spend hours on tortuous trails. In the steepest valleys, settlements are themselves terraced, like the cultivated land.

In most of the Rif the terms "hamlet" and "village" are complete misnomers. Reflecting the independent spirit of their owners, Rifian houses are separated by at least a hundred meters; in Aith Wariyaghar the usual spacing is three hundred meters,[2] and in former generations each house had a corner tower used as a lookout and blockhouse. The houses that make up a lineage unit are usually closer to one another than they are to those of any other unit, but a man must walk a short distance to visit his brother. In Sanhaja as-Srair, however, he would have only a few steps to walk. In Jbala and Ghmara the houses of kinsmen often have common walls. In most of Morocco, and especially in the Rif, houses are located in territory that indisputably belongs to one tribe or another. Border zones are seldom used except as range land, and in former generations even this use led to violent conflicts.

Types of Houses

In the whole of Morocco there are at least seven distinct types of houses. In the Gharb and in most of the coastal zone between Rabat and Wad Lukkus, the common house is a crude conical structure (*nouala*) of cane and thatch. On the southern slopes of the Atlas and in the oases of the pre-Saharan zone, houses are huge multistory structures (*qsar*) made of rammed mud blocks. On the northern slopes of the High Atlas, houses are built of stone, and resemble solid little blocks.

[1] See the aerial photographs of Taghzut in Jules Blache, "Modes of Life in the Moroccan Countryside," *Geog. Rev.*, 11 (1921), 501.

[2] A. Sánchez Pérez, "Datos historicos sobre ciudades rifeñas," in *Selecciones de conferencias y trabajos realizados durante el curso de interventores, 1951–52* (Tetuán: Imprenta Cremades, 1952), describes this distance as "el radio mínimo del espacio vital que un Rifeño de buena raza necesita para respirar a sus anchas."

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2
Senhaja MX4

tradition that rye could be grown on unclaimed land, beyond the reaches of ordinary agriculture.[5]

Hunger or plenty depends largely upon the success or failure of the cereal crop. Tree and garden crops supplement but never supplant the cereals. The most important secondary crops are from fruit and nut trees, which are especially numerous in the western part of the Rif. The most important are the olive, pomegranate, fig, and walnut. Apples and plums are grown by some of the highland tribesmen, who graft them on hawthorns. At lower elevations, especially on south-facing slopes, orange, peach, and apricot trees are occasionally seen.

Dried figs and raisins are second only to the cereals as staple foods. The importance of the trees is indicated by the complicated pattern of their ownership. On a given farm, all the trees may belong to an outside party, perhaps the former owner of the land who refused to relinquish title to his trees. One tree may be owned by several people in partnership, and sometimes different people own different branches, or claim parts of the crop on the ground. At one time the Rifians seem to have used grapes or other fruits to make fermented beverages, for Leo Africanus describes them as being "so excessively given to drink, that they scarcely reserve wherewithal to apparel themselves."[6]

Irrigated plots in the valleys of Wad Ghis and Wad Nkour produce broad beans, chickpeas, potatoes, onions, tomatoes, peppers, carrots, turnips, and squash. Add eggs, and an occasional feast of mutton or goat meat and you have the main ingredients of the Rifian diet. In recent years fish have been brought in from Alhucemas to the principal rural markets. Fish are regarded as a delicacy, and are usually fried and eaten in the market place.

West of the Rif the dietary situation improves, but it becomes more hazardous toward the east. This distinction is based on the differences in precipitation and runoff. In the eastern lowlands, precipitation is too meager for vines and figs, and extensive irrigation is possible only in the valleys of Wad Kert and Wad Moulouya. The tribesmen of Garet suffer from acute want in any unusually dry year, and most adults remember at least one famine. Garet and Gal'aya are northern Morocco's main areas of emigration.

In the Sanhajan highlands and in most of Ghmara and Jbala, each hamlet has a reliable source of irrigation water. The main irrigated crops are maize, beans, and squash. The planting of beans between the rows of maize may indicate an unformulated appreciation of the value of pulses as restorers of the nitrogen content of the soil. Perhaps not; for the plants in this New World combination seem to have been introduced as one complex by Andalusian refugees.

In most of the central highlands, and especially in Sanhaja as-Srair, *kif*, or hemp (*Cannabis sativa*), is an important cash crop. It is grown under irrigation during the summer, and is usually planted and harvested at about the same time as maize. After it has been reaped, the stems of the plant are submerged in a stream and held down with stones. After two or three days of soaking, the fibers are separated and used to make cord, mats, and baskets.

Traveling from the central highlands toward the Atlantic lowlands, one notes

[5] C. S. Coon, "Tribes of the Rif," *Harvard African Studies*, 9 (1931), 47–48.

[6] Leo Africanus, *The History and Description of Africa* (London: Hakluyt Society, 1896), II, 516.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2

of Garet. In the Atlantic coastal zone most of the surface is cultivated, and little vegetation is left to serve as browse. In the eastern plains goats are replaced by sheep, which begin to outnumber them in the lower parts of the Rif. In the Middle Atlas the raising of sheep is associated with transhumance. This mode of pastoral life is still followed to some extent by the Ulad Stut, Aith Bu Yihyi, and Ibdharsen, who spend the winter months near their cereal fields and the summer months in higher country with their sheep. The routes of migration run from the alluvial lowlands into nearby hills, especially the Kar-Kar range. In recent years the development of new irrigation projects has discouraged pastoral life, and the migration is now limited to a few of the young men and boys.

In the western provinces the main draft animals are cows or oxen. In the highlands and in the eastern lowlands the beasts of burden are donkeys and mules, which are used also for threshing and turning olive grinders. Mules are highly prized, for they can carry a heavier load than donkeys and are more agile and hardy than horses. Since there are few horses in the northern zone, most mules are imported from elsewhere in Morocco or from Spain. Moroccan donkeys are a small but hardy race, able to withstand long journeys with heavy loads. Horses have little value except as symbols of wealth and prestige, and are seldom used in the mountains. At the time of the Spanish conquest there were no horses at all in Aith Bu Nsar, Aith Seddath, and Aith Khannus.[11] Camels are restricted to the plains of Garet, where about 2,000 of them are used as milk, pack, and draft animals. Except for an occasional playful experiment, camels are not ridden.

The pack saddle for donkeys and mules is a heavy object made of cloth stuffed with straw. Panniers of twilled basketry, consisting of a double container connected by a strip of basketry, serve nearly all transport needs. Riders perch on top of the load and let their legs dangle to one side. There is little riding in the mountains, for a healthy man can make better time on foot.

Women are the most important burden bearers. Lines of women or girls bent under heavy loads are a common sight everywhere in Morocco. In Jbala they may be seen on any road carrying huge loads of wood and charcoal (pl. 8, *b*).

The domestic animals in northern Morocco include ferrets used in hunting, dogs, cats, and chickens. The dogs are of two types, one a small cur and the other a larger sheep dog. Chickens are the exclusive property of women, who sell them and their eggs independently of their husbands. Bees are kept in the mountains, but the average tribesman knows nothing of apiculture, and prefers to assign the task to paid specialists.

Irrigation and Water Rights

In Moroccan agricultural terminology the most important distinction is that between *bilad bour*, the land of dry farming, and *bilad saqiyah*, the land of irrigation. By far the greatest amount of irrigated land is watered by diversion of surface runoff (pl. 5, *b*). Small dams (*mechra*) are used to divert water into ditches (*saqiyah*), which lead to the irrigable land. The ditches often follow tortuous contours, and may extend for several kilometers. The larger streams are flanked by several channels, sometimes five or six, each bringing water from a

[11] Coon, "Tribes of the Rif," p. 39, cited in note 5.

A, [See p. 132--Analyst]

B, [See p. 129--Analyst]

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

241 different dam. In deep valleys it is often necessary to move water back and forth
312 across the natural drainage lines. For this purpose, wooden conduits are set on
171 long tripods. Construction of irrigation works begins in the spring, and after a few months of use the water is redirected into its natural course. Since water is required only during the dry season, irrigation systems are designed for the minimum runoff. On steep slopes, water is carefully directed into a series of ponds; check dams are used to impound water from springs. Channels are constructed to lead water to grist mills, but the use of water for milling has a low priority, for most communities also have smaller mills turned by hand.

The construction and maintenance of dams and irrigation ditches require less effort than the construction and maintenance of terraces. With the exception of a few works in the coastal plains, terracing is necessary for irrigation. Since irrigation involves channeling rather than simple flooding, most terraces have a slight slope and are supported by stone walls (pl. 6, *b*). There is no rotation of crops on irrigated land. In areas of thin residual soil the land is gradually built up by the constant deposition of baskets of mud, another of the backbreaking tasks assigned to the women. Fertilizer, a mixture of sheep dung and ashes, is applied each year.

312 The regulation of water rights is a complicated matter.[14] The rights of pref-
17 erence pass from human beings to animals, crops, and industries. The two main
[423] rivers of the Rif, Wad Ghis and Wad Nkour, illustrate the problems of management. Wad Ghis has only about a fourth of the flow of Wad Nkour, but its flow is more predictable. Those who irrigate with its waters know the quantity they can expect, and plan accordingly. In normal years Wad Nkour irrigates nearly ten times as much land as Wad Ghis, but in some years it remains little more than a muddy trickle. Hence there is frequent occasion for disputes, which in the past often led to prolonged feuds. In both basins the mountaineers have almost unlimited use of water, while the more numerous plainsmen must be satisfied with what is left. Most Rifian communities have secondary sources of water: wells, springs, and ponds. Each family is allowed a certain time at the water source, and the community as a whole works out the regulations and fines.

An elaborate series of agreements, usually verbal, deals with the construction and maintenance of irrigation works. The labor of construction as well as the necessary reconstruction after heavy rains is done by representatives of the fami-
[578] lies using the water. Infractions of agreement often lead to differences of opinion about these responsibilities or the period of time water is used. Serious disputes may arise over the outlines of ditches, and for this reason it is necessary to gain the consent of each property owner over whose land the water is to flow. The irrigation turns of the larger communities are regulated by days. Within such communities, individual families are allowed shorter periods of use, usually an hour. The mechanics of irrigation requires the use of the hoe to build up and then destroy a tiny diversion dam.

[113] [14] In this section I have made use of J. M. Paniagua y Santos, "Notas sobre el derecho consuetudinario de la propiedad en el Rif," *Archivos del Instituto de Estudios Africanos*, 4 (1948), 1–44; D. M. Hart, "An Ethnographic Survey of the Riffian Tribe of Aith Wuryaghil," *Tamuda*, 2 (1954), 55–57; and D. A. Caponera, "Water Laws in the Moslem Countries," *FAO Development Paper 43* (Rome: Food and Agricultural Organization of the United Nations, 1954).

A, [See p. 130--Analyst]
A

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2

practice to allow sheep to graze on stubble, many slopes are completely bare when the first rains fall. Erosion is retarded during spring and summer when a part of the runoff is diverted into irrigation ditches, but the irrigation systems promptly disintegrate at the beginning of the rainy season, and runoff again follows the network of gullies (pl. 11, *a*).

Gullying is most severe in the hilly areas of the Rif. The basins of Wad Ghis, Wad Nkour, and Wad Kert show an intricate pattern of short, steep slopes. "Ghis" means "mud" in Arabic, and most of the mud comes from the denuded highlands. The lower course of each river is joined by deeply entrenched tributary streams cutting through old fans and terraces. In Targist, Thimsaman, and Tafarsith the best farms are on fragments of Pliocene conglomerate, isolated from one another by deep ravines. Badland topography covers most of the area between Wad Nkour and Wad Kert. This may be described as an erosion-induced hoe-culture, for slopes are so badly dissected that it is no longer possible to use plows. The desperate effort to produce grain is abandoned only when the harvest does not repay the investment in seed. Cereals are sown in gullies and on nearly vertical slopes. The Spanish learned to their dismay that hungry Rifians try to cultivate even the roadbeds. The plains of Garet and the lower Kert constitute islands of alluvium in a sea of denuded terrain. Serious erosion becomes evident as soon as one passes to older terrace and residual soils. The hills of Ikibdhanen and the volcanic eminence of Gurugú are as bare as the limestone peaks.

The pattern of gullies and rills continues into the hills of Jbala and Ghmara, but the most serious problem in these areas is sliding. The roads from Tetuán to Tangier and Shawen are blocked by slides every year. In Anjra and Fahs one is never out of sight of a slide scar. Gullying is less serious than in the eastern sector, but streams are slightly entrenched even in the rolling country south of Tangier, and the marine terraces between Arcila and Larache are cut by deep barrancas.[13]

[13] René Raynal, "Bodenerosion in Marokko," *Wissenschaftliche Zeitschrift der Martin-Luther-Universität Halle-Wittenberg*, 5 (1956–1957), 885–894.